

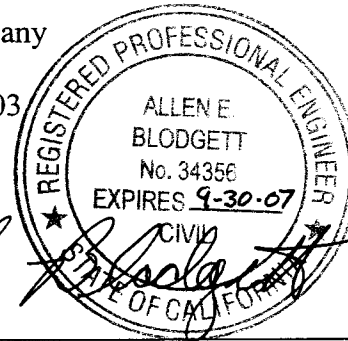
Revised Final

RCRA CLOSURE WORK PLAN

THE DOW CHEMICAL COMPANY
305 CRENSHAW BOULEVARD
TORRANCE, CALIFORNIA

Prepared for

The Dow Chemical Company
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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
BIF unit	Boiler and Industrial Furnace Unit
Btu	British thermal units
CCR	California Code of Regulations
CCV	Continuing calibration verification
CDWR	California Department of Water Resources
CFR	Code of Federal Regulations
DL	Detection limit
Dow	The Dow Chemical Company
DTA	Dowtherm® A
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency (U.S.)
Facility	Dow Torrance Facility
FGR	Flue gas recirculation
HSP	Health and safety plan
HWMU	Hazardous waste management unit
ICV	Initial calibration verification
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MB	Method blank
MCL	Maximum contaminant level
MDL	Method detection limit
MRL	Maximum reporting limit
MS	Matrix spike
MSD	Matrix spike duplicate
NOD	Notice of Deficiency
OVA	Organic vapor analyzer
OVM	Organic vapor monitor
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PE	Performance evaluation
Permit	Hazardous Waste Facility Permit
PPE	Personal protective equipment

PRG	Preliminary Remediation Goals
RPD	Relative percent difference
QA	Quality assurance
QAO	Quality assurance objective
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SS	Surrogate spike
SWMU	Solid Waste Management Unit
TSDf	Treatment, storage, and disposal facility
URS	URS Corporation
USA	Underground Service Alert of Southern California
USCS	Unified Soils Classification System
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compound
Work Plan	RCRA Closure Work Plan

1.0 INTRODUCTION

On behalf of The Dow Chemical Company (Dow), URS Corporation (URS) has prepared this Resource Conservation and Recovery Act (RCRA) Closure Work Plan (Work Plan) to conduct RCRA permit closure activities at the Dow Torrance Facility (the Facility). The Facility is located at 305 Crenshaw Boulevard in Torrance, California, as depicted in Figure 1, which shows the area surrounding the Facility and the legal boundaries of the Facility. The Facility is located in Los Angeles County at latitude 33° 51'55" north and longitude 118° 19'50" west. The Facility is an operating unit of Dow, headquartered in Midland, Michigan. The activities described in this Work Plan are being completed in support of closing all permitted RCRA hazardous waste management units (HWMUs) at the Facility.

The Facility formerly operated under a Hazardous Waste Facility Permit (Permit) issued by the United States Environmental Protection Agency (U.S. EPA, or EPA) and the California Department of Toxic Substances Control (DTSC) on July 28, 1996. The HWMUs covered by this permit include a hazardous waste storage tank, T-307, a hazardous waste container storage area, and two identical boiler units, U-304 and U-305. The boiler units are considered BIF (Boiler and Industrial Furnace) Units under the hazardous waste regulations. More detailed information on each of these units and the Facility is provided in the RCRA Part B Permit Application (ENSR, December 1992). The permit expired on July 28, 2006. Dow does not plan to renew the permit and will now manage Tank T-307 and the CSA as 90-day generator units and will no longer treat hazardous waste in the boilers. The wastes previously treated in the boilers will now be sent off site to a permitted facility for treatment as they have since 1992. The Facility will become a hazardous waste generator and will no longer have permitted HWMUs.

This Work Plan details the closure process for the four previously permitted HWMUs, including Tank T-307, the CSA, and Boilers U-304 and U-305.

In addition to the technical details of closure, this Work Plan provides closure cost estimates and a schedule under which closure efforts are to be conducted. This plan has been developed in accordance with California Code of Regulations (CCR), Title 22, Chapter 14. At this time, Dow anticipates closure of all HWMUs by converting them to less than 90-day generator storage units or to service where they will no longer manage hazardous wastes. The primary goal of the closure process, as required by CCR Title 22, Chapter 14, is to remove hazardous waste residues from these HWMUs and to ensure that hazardous waste constituents have not been released into the concrete or soil beneath the units.

This Work Plan contains the following information:

- ◆ A description of how each HWMU at the Facility will be closed according to the closure performance standard;
- ◆ A description of steps necessary to remove all hazardous waste, decontaminate the HWMUs or render them nonhazardous at closure, and demonstrate successful closure by removal of all hazardous waste; and
- ◆ A description of other activities necessary during closure to ensure that closure performance standards are satisfied.

The Closure Plan was originally included in the RCRA Part B Permit Application (ENSR, December 1992), Section XI. Dow updated this Closure Plan in November 2005 and re-submitted it to DTSC for review. The DTSC requested further modifications to the Closure Plan in a Notice of Deficiency (NOD) letter to Dow dated July 17, 2006. This Work Plan addresses those requested modifications. The November 2005 Closure Plan and the DTSC's NOD letter are included in Appendix A.

2.0 FACILITY BACKGROUND

Dow purchased the approximately 52-acre property through a grant deed from the Santa Fe Energy Company (formerly known as the Chanslor-Canfield Midway Oil Company) on November 1, 1950. The original manufacturing plant that produces styrene polymers was constructed between 1951 and 1953. Manufacturing operations at this location commenced in 1953. The site location map is illustrated on Figure 1. Manufacturing operations at this facility include the production of polystyrene resins and the production of Styrofoam™ brand expanded foam (a trademark of The Dow Chemical Company). The land surrounding the Facility is zoned almost entirely “M2” for heavy manufacturing. There is a narrow strip of land to the east of the Facility on Del Amo Boulevard which is zoned “R1” for single family residences. A copy of the zoning map is included in Dow’s RCRA Part B Permit Application, Drawing II-2.

The Facility is comprised of nine grid areas referred to as “Blocks.” Three sections of Blocks exist within the Facility—the eastern section is comprised of Blocks 110/120/130, the central section is comprised of Blocks 210/220/230, and the western section is comprised of Blocks 310/320/330. A detailed site map including the Facility grid system is illustrated in Figure 2.

As described in Section 1.0, the Facility formerly operated under a Permit issued by the U.S. EPA and DTSC on July 28, 1996. The HWMUs covered by this permit include a hazardous waste storage tank, T-307, a hazardous waste container storage area, and two identical boiler units, U-304 and U-305. The locations of each of these HWMUs are depicted on Figure 2. The permit expired on July 28, 2006. Dow does not plan to renew the permit and will now manage Tank T-307 and the CSA as less than 90-day generator units and will no longer treat hazardous waste in the boilers. The wastes previously treated in the boilers will be sent off site to a permitted facility for treatment as they have since 1992. The Facility will become a hazardous waste generator and will no longer have permitted HWMUs.

2.1 SPRINGS, SURFACE WATER BODIES, AND DRINKING WATER WELLS

There are no known springs within ¼ mile of the Dow facility. There are no surface water bodies within ¼ mile of the Facility. The topographic map shows a reservoir located approximately 2,000 feet west of the Facility, but this does not appear on recent satellite photos of the area. There are three wells located 3/8 to ½ mile south of the Facility as shown on Figure 1. All three wells shown on this figure are municipal water supply wells. Well No. 776 is not currently active, according to the Los Angeles County Flood Control District.

2.2 GEOLOGY AND HYDROGEOLOGY

The Site is situated on the Torrance Plain of the West Coast Groundwater Basin and is underlain by recent alluvial deposits. Unconfined perched groundwater occurs within these alluvial deposits at depths of approximately 35 feet below ground surface (bgs). This perched groundwater is found throughout much of the coastal plain of Los Angeles County. Locally, discontinuous lenses of perched groundwater within overlapping sand lenses exist and geologic data indicate that the perched zone pinches out toward the east

and is missing throughout most of the southeastern quadrant of the neighboring refinery (ExxonMobil, 2002).

The perched groundwater is supported by low permeability silts and clays commonly referred to as the Bellflower aquiclude. The Bellflower aquiclude separates the perched groundwater from the underlying Gage-Gardena, Lynwood, and Silverado aquifers. In the vicinity of the Dow Torrance Facility, the Gage and Gardena aquifers are presumably converged, and the Lynwood and Silverado aquifers are converged beneath the western portion of the neighboring refinery (ExxonMobil, 2002). Hence, these aquifers are locally referred to as the Gage-Gardena and Lynwood-Silverado aquifers. Available information suggests that the top of the Gage-Gardena aquifer occurs at depths ranging from approximately 70 to 120 feet bgs and that the top of the Lynwood-Silverado aquifer occurs at depths of more than 300 feet bgs (California Department of Water Resources [CDWR], 1961).

The Bellflower aquitard can generally be divided into three discrete stratigraphic sections based on the predominance of fine-grained sediments (i.e. silt, clay) or coarse-grained sediments (i.e. sand, gravel), including: (1) the Upper Bellflower, which is predominantly fine-grained; (2) the Middle Bellflower, which is predominantly coarse-grained; and (3) the Lower Bellflower, which is predominantly fine-grained.

During previous investigations, the Upper Bellflower through Lower Bellflower were encountered to a maximum depth of 65 feet bgs. The Upper Bellflower was encountered from the ground surface to approximately 12 feet bgs. The upper portion of this unit is predominantly surface fill material, while the lower portion is silty, clayey sand. Groundwater was not encountered in this unit. The Middle Bellflower was encountered at approximately 12 feet bgs and consists of silty fine-grained sand. Perched groundwater was encountered at approximately 35 feet bgs. The Lower Bellflower was encountered at approximately 41 feet bgs and consists of high plasticity clay.

A RCRA Facility Investigation (RFI) which includes subsurface investigation (soil and groundwater) is being completed at one Solid Waste Management Unit (SWMU) at the Facility. This SWMU, known as SWMU No. 9 – Former Location of Aboveground Storage Tank T-7A, is currently being investigated to assess the extent of impact to soil and shallow (perched) groundwater from a historic release of styrene and ethylbenzene. The location of Former T-7A is shown on Figure 2. A network of six groundwater monitoring wells was installed in 2004 to monitor perched groundwater as part of this investigation. The locations of these wells are shown on Figure 3. The perched groundwater potentiometric surface beneath the Dow facility is somewhat flat with a southeasterly gradient of approximately 0.004 foot/foot (0.4 foot vertical drop per 100 feet horizontal) as measured at this well network during the most recent groundwater monitoring event (second quarter 2005).

2.3 WEATHER AND CLIMATIC CONDITIONS

Torrance is located in the Los Angeles basin approximately 20 miles south of downtown Los Angeles. The Los Angeles basin is noted for its moderate weather. Under the modified Köppen classification system, the Los Angeles climate is categorized as Mediterranean. This climate type is characterized by

pronounced seasonal changes in rainfall; a dry summer and a rainy winter, but relatively modest transitions in temperature.

In the dry season, which lasts from May through October, the eastern Pacific high pressure area, a semi-permanent feature of the general hemispheric circulation pattern, dominates the weather over much of southern California. Warm and very dry air descending from this Pacific high caps cool, ocean-modified air under a strong inversion, producing a marine layer. This marine layer is the prominent weather feature for the Los Angeles Basin for much of the year, especially from late spring through early fall.

Daily variations in the strength of the Pacific high result in variations in the depth and coverage of the marine layer, which typically thickens and advances inland during the night and early morning hours, before retreating to the sea or “burning off” to hazy sunshine around midday.

Due to the dominance of the stable marine layer, significant precipitation is rare between May and October. Any rain that does occur at this time of year is usually the result of isolated thunderstorms associated with subtropical moisture.

During the remainder of the year, from November through April, the eastern Pacific high pressure ridge is displaced and the Los Angeles basin finds itself on the southern margins of the northern hemisphere polar jet stream. With cold air aloft, the marine layer breaks down and is no longer dominant. Pacific storms, sometimes fed with subtropical moisture, often push cold fronts across California from northwest to southeast. These storms and frontal systems account for the vast bulk of the area’s annual rainfall. Such rainy season storms are migratory, with wet and dry periods alternating during the winter and early spring with considerable irregularity in timing and duration.

Average annual precipitation for the Los Angeles area is highly variable and terrain-dependent, ranging from twelve inches at the ocean to about twice that in the foothills. At downtown Los Angeles, the average seasonal rainfall is 14.77 inches. The annual average high temperature for the city is 75° F, while the average low is 57° F.

Winds are generally light, with frequent afternoon sea breezes of 10 to 15 miles per hour. While severe weather is uncommon, strong offshore winds, known as Santa Anas, can reach hurricane strength below passes and canyons. Also, passing winter storms can bring southeast winds to gale force. However, for the most part, damaging winds tend to be rare, or highly localized.

2.4 FACILITY DESIGN

Details of the facility design are provided in Section IV of the RCRA Part B Permit Application. This section provides a detailed overview of the design and configurations of each HWMU, including the types and quantities of hazardous wastes handled.

2.4.1 Container Storage Area

Dow stores containerized hazardous wastes at a central container storage area at the Facility. A site plan of the container storage area is shown in Figure 4. The types of wastes stored in the container storage area, both currently and in the past, are provided in Table 1.

The Facility employs steel 55-gallon drums, polyethylene drums with capacities of 14, 25, 30, and 45 gallons, and stainless steel totes with capacities of 245 and 300 gallons for storage of hazardous wastes. All polyethylene drums are open head with steel closures. Steel drums include open head with steel closures and closed head with bungs. Totes are equipped with a 24-inch diameter manhole, but are normally filled and emptied through a 3-inch diameter screw bung. No containers are lined.

The maximum storage capacity of the container storage area is 30,000 gallons. Based upon the maximum storage capacity, a maximum of five hundred forty-five (545) 55-gallon drums could be stored in the container storage area. Liquid-containing 55-gallon drums are placed on portable secondary containment pallets. Each secondary containment pallet is capable of holding four 55-gallon drums and can be stacked two high when fully loaded. Therefore, five hundred forty-five (545) 55-gallon drums could feasibly be placed on 137 pallets, or 68 stacks of two pallets each plus one single pallet.

Also based upon the maximum storage capacity, a maximum of one hundred 300-gallon stainless steel totes could be stored in the container storage area. Stainless steel totes are placed on portable secondary containment units. The area occupied by each stainless steel tote secondary containment unit is 66 by 66 inches. Each stainless steel tote secondary containment unit is capable of holding two totes, one stacked directly upon the other. Therefore, 100 totes could feasibly be placed in 50 secondary containment units in the container storage area.

The container storage containment area is constructed of asphalt paving, ramps, and curbs. The containment area is 57 feet, 11 inches by 113 feet in plan dimension with a minimum 7-inch high curb. Precipitation falling within this area is collected by a central catch basin, and flows by gravity to a sump located outside the area. The external sump is 8 feet long, 5 feet wide, and 6 feet deep, and the top is about 12 inches above grade. The sump is equipped with a manually-activated pump, which discharges to the facility process wastewater system.

Liquids stored in 55-gallon drums are placed on portable secondary containment pallets, fabricated from polyethylene. The 55-gallon drum portable secondary containment units have spill capacities of 85 gallons per pallet. Each secondary containment pallet is capable of holding four 55-gallon drums. When holding four drums, the secondary containment pallets can be stacked two high. Containment pallets are maintained free of cracks or gaps.

The liquid-containing 245- and 300-gallon stainless steel totes are also stored in portable secondary containment units fabricated from polyethylene. The stainless steel totes must be lowered into the portable containment unit by means of a sling mounted to a forklift unit. Each portable containment unit is capable of holding two stainless steel totes at a time. In either case, the construction material of

portable storage containment units is sufficiently impervious to both stored materials and accumulated precipitation. Tote containment units will be maintained free of cracks or gaps.

Containment pallets and units are covered as needed to prevent accumulation of precipitation in these devices. Covering will be achieved by placement under the shed roof at the south end of the container storage area, or by securing a waterproof tarp over the loaded pallet or unit.

Because of the use of portable secondary containment devices for storage of liquid waste streams, the asphalt-constructed container storage area serves as a tertiary containment system.

2.4.2 Storage Tank T-307

Dow stores hazardous waste in Tank T-307. The waste stored in this vessel is a hydrocarbon waste from polystyrene manufacturing. This waste contains a mixture of compounds including styrene monomer, ethylbenzene, styrene dimers and trimers, mineral oil, and polystyrene oligomers. The waste can also contain trace levels of benzene. These constituents are consistently in the waste with variations in concentrations.

Tank T-307 is a horizontally mounted cylindrical tank. The specifications for T-307 are provided in the table below.

Specification	Tank T-307
Dimensions, length x diameter, in feet	22 x 10
Capacity, in gallons	15,000
Shell thickness (and corrosion allowance), in inches	0.25 (0.16)
Pressure rating, design (and operating), psig	75 (10)
Structural Supports	concrete crib
Roof design	fixed (pressure vessel)
Age of Tank	1980
Location of Tank	outdoor
Tank orientation	horizontal

Tank T-307 has been designed in accordance with ASME Section VIII, Division I (1977 Edition) standards for pressure vessels. The tank is made of stainless steel type SA240T-316. A piping and instrumentation diagram for Tank T-307 is shown on Figure 5. The tank is equipped with temperature and level indicators. The interior can be accessed by a manway at one end.

Tank T-307 is used on an as-needed basis, with flows into and out of the tank being controlled and monitored by process operators. There are two types of material handled by Tank T-307. These two materials are a recovered hydrocarbon byproduct stream, referred to as “tars”, and the excess portion of a stream that is normally recycled back into the polystyrene production process, referred to as “recycle”. Both waste streams consist of similar hydrocarbons as described above, with the “tars” stream containing a higher proportion of styrene dimers, trimers, and oligomers, and mineral oil, and the “recycle” stream containing mostly styrene monomer and ethylbenzene. Both of these streams are transferred to Tank T-307 on an as-needed basis from the polystyrene production process. Waste is piped directly from the process to the tank.

Automatic waste feed cutoff to the tank is activated by the high-high level switch, as indicated on the piping diagram.

The tank is located within a concrete, lined secondary containment area as shown on Figure 9. The tank containment area is constructed of reinforced concrete slabs with epoxy surface coatings. The containment area for Tank T-307 consists of a 42 foot by 58 foot diked area with 3.5-foot high walls. The tank containment area is sloped to a manually operated “sluice gate” type drain in the dike wall. This gate is normally closed, and is opened after a rain event to drain accumulated liquids. Drainage from the Tank T-307 sluice gate flows to an external sump, from where it is pumped to the process sewer system.

The Tank T-307 containment area includes three other tanks: Tanks T-303 which has a capacity of 15,000 gallons, T-311 which has a capacity of 3,260 gallons, and T-599 which has a capacity of 4,900 gallons. The containment system has a capacity of approximately 60,000 gallons. The required capacity for this area is approximately 29,000 gallons, which is the volume of the largest tank plus the volume of precipitation that would fall into the bermed area during the 24-hour, 25-year storm (5.97 inches of precipitation). Each containment system is designed to surround the tank completely and to cover all surrounding earth that would likely come in contact with wastes released.

2.4.3 Boilers U-304 and U-305

Dow operates two boilers for heat recovery from hazardous wastes. These units are regulated as boilers under final rules promulgated by the U.S. EPA at 40 Code of Federal Regulations (CFR) Parts 266 and 270. The units are not RCRA “incinerators” as regulated by the U.S. EPA at 40 CFR Parts 264 and 270 or as regulated by the California DTSC at 22 CCR 66264 or 66270. The Facility operates two identical boiler units, U-304 and U-305, which are watertube type boilers. The heat generated in the boiler is transferred by radiation and convection to the heat transfer fluid (Dowtherm® A, or DTA) which enters the boiler at the bottom, passes through a series of tubes, and exits to the manufacturing process. The boilers are each designed to operate at a maximum heat input of 9.75×10^6 British thermal units (Btu)/hour. Both heaters were manufactured by Struthers Wells (Warren, PA) in 1979 and are designated as Model No. 7CV19-6PH. Each unit is 7 feet in diameter by 50 feet high, including the stack. The combustion chamber is roughly 21.5 feet long, and thus its volume is approximately 831 feet³. The boiler is constructed of A-36 carbon steel lined with 3-inch refractory. The fan, stack, flue gas piping, and combustion air piping are also carbon steel. The waste fuel piping is 316 stainless steel. A schematic diagram for the boilers is shown on Figure 6. The boilers are located within a concrete, lined secondary containment area as shown on Figure 10.

The boilers are designed to accept three types of feed materials: 100% natural gas; a mixture of natural gas and recovered hydrocarbons (hazardous waste); or 100% low NO_x fuel oil (used during periods of natural gas curtailment). Liquid hazardous waste feed stored in Tank T-307 was fed from this tank through the heaters through a mass flowmeter, two auto block valves with a manual bleed valve between the block valves, control valve, tie point to the fuel oil line, then through an oil gun to the burner. The liquid fuel gun is removable during operation. Natural gas enters through a separate piping arrangement to the burner. The characteristics of the waste burned in the boilers are described in Section 2.4.2 above. It

should be noted that, by design, it is not possible to fire low NO_x oil and waste simultaneously. For that reason, natural gas was the only supplemental fuel fired to either unit when waste was burned. A waste feed cutoff system has been installed on the boilers. Each boiler is equipped with low-NO_x burners and each unit is equipped with a flue gas recirculation (FGR) system for additional NO_x control.

3.0 PROJECT MANAGEMENT

The closure project team will include technical professionals with experience in project management, quality assurance (QA), analytical chemistry, closure and field investigations, data management, and other technical and engineering disciplines.

Team member responsibilities include the following:

- ◆ The Project Manager has ultimate responsibility for providing overall program coordination and QA reviews of documentation and field activities. The Project Manager is responsible for the contractual aspects of the project work and will ensure that appropriate staff is assigned to the project. The Project Manager is also responsible for ensuring that the technical activities have appropriate planning and oversight to assure that the quality and timeliness of project data and reports produced meet project requirements, and that there are adequate field equipment and other resources allocated to fulfill the needs of the project. The Project Manager will also ensure that all reports are given independent technical review by senior staff prior to finalizing them. The Project Manager has the primary responsibility for decision-making and communication with the Dow Project Coordinator.
- ◆ The Project Independent Registered Professional Engineer will be responsible for evaluating field activities and subsurface investigations, data evaluation and interpretation, and report preparation, in addition to overseeing and redirecting work as necessary on various project-related field and office tasks to ensure it is performed in a manner consistent with this Work Plan. This person will keep the Project Manager abreast of any inconsistencies he finds between the actual project field activities and the procedures described in this Work Plan.
- ◆ The Field Manager is responsible for coordinating and directing field work; assuring that the field staff has adequate training in both the field sampling and measurement procedures and health and safety procedures; reporting the status of the field activity to the management team; and directing any subcontractors. The Field Manager has the overall responsibility for implementing the work plan, communicating any difficulties encountered, and has the authority to stop work if safety or data quality may be affected by site operations.
- ◆ The Project Chemist is responsible for assuring that the planning, implementation, and reporting of site investigation activities fulfills the objectives for data use. This includes laboratory selection and management, Quality Assurance Project Plan (QAPP) development, data evaluation/validation implementation, audit performance, corrective action implementation, database information flow, and identification and communication to the Project Manager of problems that affect data quality and schedule.
- ◆ The Data Management Task Leader is responsible for maintaining the project-specific database, reporting results in required formats to the data users, and assuring the integrity of the project-specific database.
- ◆ The Project Health and Safety Officer is responsible for health and safety plan (HSP) review and approval. The safety officer reviews and approves any changes in personal protective clothing or respiratory protection requirements. The safety officer will be responsible for communicating effective use of site monitoring equipment. The safety officer will maintain project health and safety files.

Other project staff members include technical professionals with expertise in risk assessment, chemistry, geology, hydrology, and remedial engineering. These individuals are responsible for internal communication and task planning to ensure that data obtained can be used for the intended purposes, and to provide the direction and supervision needed to ensure that technically sound decisions are made within their areas of expertise.

4.0 CLOSURE AND FIELD INVESTIGATION OBJECTIVES AND DESCRIPTION

The closure and field investigation activities presented in this work plan are designed to remove all residual hazardous waste from the formerly permitted HWMUs, to decommission the HWMUs by converting them to generator (90-day) storage areas or removing them from hazardous waste service, conduct confirmation sampling of hazardous waste processing equipment, and collect concrete and soil samples for chemical analysis to ensure that hazardous waste constituents were not released into breach containment devices during the course of hazardous waste processing. The scope of work developed to meet these objectives is summarized as follows.

1. Update the site specific HSP to protect workers during this investigation.
2. Decontaminate or remove hazardous waste processing equipment.
3. Conduct confirmation sampling to ensure all residual hazardous waste has been removed prior to decommissioning HWMUs.
4. Conduct subsurface utility clearance in preparation for concrete and sub-slab soil investigation.
5. Collect concrete and sub-slab soil samples for chemical analysis.
6. Submit a documentation report upon completion of the RCRA permit closure activities.

The objectives of the closure and field investigation are to close the HWMUs in a manner that:

- ♦ Minimizes the need for further maintenance;
- ♦ Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and
- ♦ Complies with the applicable closure requirements of 22 CCR Chapter 14.

This Work Plan outlines the procedures and estimated costs associated with the closure of a hazardous waste storage tank, a container storage area and two boilers. The HWMUs will be closed in a manner that meets the objectives described above.

4.1 DESCRIPTION OF HAZARDOUS WASTE CONSTITUENTS

The hazardous waste constituents that may have been released to the surrounding containment area or surrounding soils from the HWMUs are discussed for each unit below.

4.1.1 Container Storage Area

Dow stores several types of waste generated at the Facility in the container storage area. As discussed in Section 2.4.1 the types of wastes historically and presently stored in this area are listed in Table 1. The

constituents of these wastes have been determined by Dow utilizing the test methods identified in their Waste Analysis Plan, which is part of the RCRA Part B Permit Application, Section III. Results from these analyses were used to profile these wastes prior to treatment and/or disposal at off-site permitted facilities.

The EPA analytical methods from SW-846 listed for characterization of these wastes in the Waste Analysis Plan are the same methods planned for use in the pavement and soil sampling plan for closure of this unit, as described in Section 5.6. These include the following:

- ◆ VOCs by EPA Method 8260B;
- ◆ Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, silver, thallium, and zinc by EPA Method 6010;
- ◆ Mercury by EPA Method 7471A; and
- ◆ Chromium VI by EPA Method 7196.

4.1.2 Storage Tank T-307 and Boilers U-304 and U-305

As described in Sections 2.4.2 and 2.4.3 above, storage tank T-307 and boilers U-304 and U-305 are used to manage the same waste stream. This waste contains a mixture of compounds including styrene monomer, ethylbenzene, styrene dimers and trimers, mineral oil, and polystyrene oligomers. The waste can also contain trace levels of benzene. These constituents are consistently in the waste with variations in concentrations. Waste from Tank T-307 was piped directly to the boilers using an oil gun. The constituents of these wastes have been determined by Dow utilizing the test methods identified in their Waste Analysis Plan, which is part of the RCRA Part B Permit Application, Section III.

The EPA analytical methods from SW-846 listed for characterization of this waste in the Waste Analysis Plan provide the basis for selection of the analytical methods to be utilized in testing for hazardous waste constituents in the pavement and soil sampling plan for closure of these units. Pavement and soil samples will be analyzed for VOCs by EPA Method 8260B. Further details of the analytical test methods and pavement and soil sampling plans are provided in Section 5.6. Similarly, confirmation wipe testing will be conducted on Tank T-307 and the boilers following decontamination. Wipe samples will also be analyzed for VOCs by EPA Method 8260B. Further details of the test methods and procedures for the confirmation wipe testing are provided in Section 5.5.

4.2 HAZARDOUS WASTE INVENTORY REMOVAL PROCEDURES

The inventory of hazardous waste in Tank T-307 will be shipped off site to a permitted facility for treatment or disposal. Solvent and water used to decontaminate the interior of the tank as well as material in the boiler supply lines will be handled in a similar manner. Closure of the tank and boilers may also generate hazardous waste residue. Any such material generated during the decontamination of the storage tank or boilers will be containerized and moved to the container storage area or shipped directly off site for disposal. All wastes generated during the closure process will be disposed of off site and not in the boilers.

The inventory of containerized hazardous wastes remaining in the container storage area will be shipped off site to a permitted facility, at which time closure of the container storage area can begin. Since the Facility is to remain operational following closure of the HWMUs, newly generated containerized hazardous wastes will be shipped off site to a permitted facility within 90 days of their accumulation start date. The container storage area will remain a 90-day generator (non-permitted) container storage area.

Permitted off-site treatment, storage, and disposal facilities (TSDFs) that may receive Dow's wastes are currently located throughout California and the surrounding region. At the time of closure, Dow will select appropriate disposal facilities based on permit status, treatment technologies, price, potential future liabilities, and other factors. One facility that is currently capable of receiving Dow's wastes is Veolia Environmental Services in Azusa, California. The distance to this facility from Torrance is about 38 miles.

4.3 DISPOSAL OR DECONTAMINATION OF EQUIPMENT, STRUCTURES, AND SOIL

All equipment will be properly decontaminated by steam cleaning or solvent rinsing. Rinsate will be collected by a vacuum truck or drummed prior to disposal. Rinsate water will be disposed of at a permitted facility or an approved wastewater treatment plant, if deemed acceptable based on characterization of the rinsate. Rinsate solvent and water will be disposed at a permitted off-site facility. Decontaminated equipment will be reused by Dow or sold for reuse or scrap to the maximum extent possible. Equipment expected to continue in service at the Facility includes the boilers, tank, piping, pump motors, and instrumentation. Details of decontamination and disposal procedures for each HWMU are provided in Section 5.4.

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in permitted off-site facilities. Decontaminated structures may be returned to similar service, i.e. used in 90-day generator service at the Facility, or demolished down to the base pad. Decontaminated debris will be removed and recycled or disposed of as clean construction debris. Details of decontamination and disposal procedures for each HWMU are provided in Sections 5.4 and 5.9.5, respectively.

Underlying native soils will be sampled at each HWMU to determine if waste constituents have migrated through containment systems. Detection of waste constituents in soil samples at concentrations in excess of screening levels will require an evaluation to determine potential impact to deeper soils, groundwater, and soil gas and may require further soil sampling, sampling of groundwater, and/or soil gas sampling to determine the vertical and lateral extents of impact. In this case, Dow will present such an evaluation in an interim report to the DTSC which includes a work plan for further sampling required as part of this evaluation. Following characterization of the extent of the impact, soils may be excavated and removed to a permitted off-site facility, or left in place if they pose no unacceptable risk to human health or the environment. Remedial activities may also include groundwater and soil gas cleanup if these media are impacted with waste constituents at concentrations that present a risk to human health or the environment and these activities would be described in a follow-up work plan. Details of remediation and disposal procedures for soils are provided in Section 5.8.

4.4 CLOSURE CERTIFICATION

Closure will be certified and documented by an independent registered professional engineer. The certification will attest that the relevant HWMU has been closed in accordance with the specifications in the approved Closure Plan. The certification will include the following.

4.4.1 Activities to be Conducted

The engineer certifying closure will observe typical procedures during closure to ensure that they meet the requirements of the approved Closure Plan. These include hazardous waste inventory removal, equipment decontamination, verification sampling, and removal of contaminated materials.

4.4.2 Testing and Analyses to be Performed

The engineer certifying closure will observe typical sampling conducted to verify clean closure, including chain-of-custody procedures. The engineer will review analytical data from the laboratory, including the results of quality control samples and calibrations, to determine if decontamination is successful.

4.4.3 Criteria for Evaluating Adequacy

The engineer will certify that closure is complete if all relevant procedures described in the approved Closure Plan have been followed. The engineer will document any deviations from the approved procedures, recommendations to correct deviations, and the results of corrective action.

4.4.4 Schedule of Inspections

The engineer certifying closure will conduct inspections as needed to perform the activities identified in Section 4.4.1. These inspections will be scheduled as the closure proceeds, according to the progress achieved on the various closure tasks. The inspections will generally be unannounced, except when coordination is needed to observe an “instantaneous” activity (e.g., sampling).

4.4.5 Types of Documentation

The engineer certifying closure will document observations in Field Engineer Observation Report Forms, as needed to ascertain that the approved Closure Plan has been implemented. A copy of this form is included in Appendix B. These notes, and a brief narrative describing the observations, will be included in the certification report. The narrative will describe, as a minimum, the following:

- 1) Activities conducted during closure;
- 2) Testing and analyses performed;
- 3) Criteria for evaluation of adequacy;
- 4) Schedule of inspections;
- 5) Types of documentation; and
- 6) Certification signed by a Dow representative and certifying engineer.

The report will also include the analytical data reports from the laboratory.

4.5 SCHEDULE FOR CLOSURE

Closure of the individual HWMUs will proceed concurrently.

At this time, there is no anticipated date for closure of the Torrance facility, and operations are expected to continue for the foreseeable future. However, the current plan is to close the HWMUs while the Facility remains active. In order to satisfy regulatory requirements, the year 2007 has been selected as the date for closure of the HWMUs in a safe and secure manner as required by RCRA and by the DTSC. Written notification of closure activities will be sent to DTSC at least 45 days prior to the date closure activities are expected to begin. Post-closure plans are not required, as no hazardous waste is disposed on this site.

Closure of each of the HWMUs will proceed concurrently. The total time required to close each HWMU at the Facility (including the time required to treat or dispose of the entire hazardous waste inventory) is as follows.

4.5.1 Time Allowed for Closure

All hazardous wastes will be removed from storage and shipped off site for disposal within 90 days after receiving the final volume of hazardous wastes at each unit. Final closure will be completed within 180 days after receiving the final volume of hazardous wastes at each unit. The current plan is that the container storage area and hazardous waste storage tank (T-307) will continue in service as 90-day hazardous waste generator units, storing hazardous wastes for up to 90 days from the date they are generated.

A milestone chart for completion of closure activities at each unit is provided below:

Activity	Day
Receipt of final waste volume.	0
Complete removal, treatment, or disposal of waste inventories.	90
Complete decontamination of equipment and structures.	110
Complete sampling and analysis, including soil beneath the various secondary containment pads	140
Complete removal of equipment/structures, if necessary.	150
Complete removal of impacted soils, if necessary (will require an extension if extensive soil removal is necessary).	170
Completion of all closure activities.	180
Submittal to Department of Closure Certification Report	240

4.5.2 Extension for Closure Time

Dow may request an extension to the time allowed for closure, in accordance with the procedures at 22 CCR 66264.113(b) and other relevant requirements. The Facility must submit this extension request at least 30 days before the deadline date.

5.0 DECONTAMINATION AND INVESTIGATIVE METHODS

This section describes the methods and procedures that will be used during the RCRA facility permit closure activities. The proposed sampling locations are illustrated in Figures 7 through 10 and summarized in Table 2. The anticipated field forms are provided in Appendix B.

5.1 HEALTH AND SAFETY

Prior to implementing the closure and field investigation, field personnel will be required to review and sign the site-specific HSP prepared by URS. The HSP addresses the following:

- ◆ Hazard identification (Section 5.0 in the HSP);
- ◆ Hazard evaluation (Section 5.0 in the HSP);
- ◆ Personal protective equipment (PPE) (Section 7.0 in the HSP);
- ◆ Environmental monitoring (Section 6.0 in the HSP);
- ◆ Site work zones (Section 6.3 in the HSP);
- ◆ Decontamination of workers (Section 10.0 in the HSP); and
- ◆ Emergency procedures (Section 12.0 in the HSP).

The HSP provides site-specific scopes of work and describes individual constituents of concern and their hazards. The specific levels of PPE will be modified based on more readily available information from the Job Safety Analyses developed by the contractor for all decontamination activities.

It is anticipated that the closure process, including decontamination and confirmation (wipe) sampling can be completed from outside the tank without requiring vessel (confined space) entry. If vessel entry is unexpectedly required, the HSP will be updated to include confined space entry procedures and provided to the DTSC for review prior to proceeding with the work.

5.2 SITE SECURITY

The Facility has implemented such access controls as a manned guard gate at the main entrance to the Facility, video cameras to monitor the Facility perimeter, and fencing around the entire perimeter of the Facility. The hazardous waste storage areas are located completely inside this secure perimeter fence. The main gate is locked when unattended, e.g., during rounds of the security technician and during nights and weekends. Aside from the main entrance, the Facility has seven other entrances which remain locked when not in use. The security technician and plant operators have the capability to monitor many areas in and around the Facility from the security building using video cameras. The video cameras are monitored by security technicians during weekday business hours and by plant operators during nights and weekends.

A security technician is posted at the main gate during weekday business hours. The security technician stops all entering non-Dow personnel to the Facility and requires them to sign in on a log.

The Facility is entirely surrounded by an 8-foot high chain link fence, topped with barbed wire to exclude unauthorized persons. The fence is maintained and kept in good repair. The waste storage areas and their associated access roads at the Facility are not open to the public.

Warning signs are posted on all four sides of the waste storage area. Warning signs are also posted at the T-307 tank as well as the two process boilers to which it could supply fuel. The warning signs are printed in English and Spanish, utilizing the required wording of “Caution -- Hazardous Waste Area -- Unauthorized Persons Keep Out” in English, and “Cuidado! -- Zona De Residuos Peligrosos. Prohibida La Entrada A Personas No Autorizadas” in Spanish. The rectangular-shaped warning signs measure 3 feet wide by 2 feet high and are legible at a distance of at least 25 feet.

5.3 SUBSURFACE UTILITY CLEARANCE

As required by California state law, Underground Service Alert of Southern California (USA) will be contacted a minimum of two working days before initiating the fieldwork. Prior to contacting USA, each boring location will be delineated with white spray paint, thereby outlining the proposed limits of subsurface work. A ticket number will be obtained to request utility clearance by parties with underground utilities in the areas. Following notification, utility owners and/or representatives will mark the approximate location of each subsurface utility. Prior to conducting subsurface fieldwork, each location will be visually inspected to verify potential conflicts. If potential conflicts are noted during the visual inspection, the utility company will be contacted to resolve the utility conflict.

The boring locations will be investigated further with the assistance of a Facility representative. The Facility representative will review facility plans for potential conflicts. Prior to conducting subsurface fieldwork, an on-site meeting will be held with the representative to approve each boring location. The Facility representative will obtain subsurface utility maps for the investigation area, which he/she will review with the Field Manager prior to selecting boring locations.

5.4 DECONTAMINATION PROCEDURES FOR EQUIPMENT AND STRUCTURES

The following plan describes the activities which will be implemented during the closure of the container storage area. This closure plan will be implemented as a partial facility closure where only the container storage area, Tank T-307 containment area, and boiler area are affected.

5.4.1 Container Storage Area

The container storage area consists of approximately 6,900 square feet of asphalt paving (roadway type). The area is fenced on all sides and is equipped with a containment berm. A containment sump exists in the area. Containerized wastes which resulted from plastics, Styrofoam®, and epoxy resin manufacturing activities have been stored there. The maximum waste inventory in the drum storage area is 30,000 gallons, or about 600 drums. A site plan of the container storage area is provided as Figure 4. Closure of this unit will be accomplished by removal of all waste so as to attain “clean closure.” Closure of the container storage area is designed to minimize the need for maintenance and to eliminate the post-closure escape of hazardous waste to the extent necessary to protect human health and the environment. As

described in further detail in this section of the closure plan, Dow will follow a sequential program beginning with the removal off site of all hazardous waste inventories. This standard for closure will be achieved by disposal of all containerized wastes and waste residues at a permitted off-site facility. Containers, which are already labeled for shipping, will be properly manifested according to the contents of each container.

In the most likely case where the Facility is to remain operational after closure of the container storage area, the waste inventory will be minimized, but a small quantity of containers may remain in the container storage area from ongoing Facility operations while closure activities take place. Hazardous waste containers will be staged at the south side of the container storage area during closure activities at the north side, and vice versa. All liquid wastes will be stored on secondary containment pallets during closure activities to prevent a spill from flowing into a cored area. The container storage area will be retained for storage of materials or continue to serve as a less than 90-day generator container storage area following closure.

In the case that the container storage area is to be closed and no longer used for waste storage, the entire waste container inventory will be shipped to an off-site treatment facility prior to beginning closure activities.

After removal of waste inventory, the blacktop and container handling equipment (e.g., dollies) will be decontaminated. Decontamination will be according to the process listed below:

- ◆ All visible residues will be manually or mechanically scraped from the containment area and containerized for off-site disposal to a permitted facility.
- ◆ Containment area surfaces will be steam cleaned until visibly clean. If visible contamination remains, the asphalt will be removed and containerized for off-site disposal.
- ◆ Rinsate will be collected in the containment sumps, directed to the sumps manually, or mopped up as necessary. From the sumps, the washwater can be pumped into containers or a vacuum truck for shipment, to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment, the rinsate will be analyzed for waste classification and disposal requirements.

Following initial decontamination, the pavement and underlying native soils will be sampled to determine whether additional corrective action or decontamination is needed prior to clean closure. Sampling, analysis, and evaluation of data are described in Section 5.6.

All equipment and structures which cannot be decontaminated shall be disposed of as hazardous waste in a permitted off-site facility. Decontaminated structures may be demolished down to the base pad or returned to service. Debris will be removed and recycled or disposed of as clean construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site facility.

Any solid hazardous wastes generated during decontamination procedures (e.g., PPE) will be containerized and shipped to a permitted off-site facility for disposal.

5.4.2 Tank T-307 Containment Area

The tank, designated as T-307, is used to store recovered hydrocarbons, classified as hazardous waste due to the characteristics of ignitability and benzene toxicity, from the polystyrene process. The recovered hydrocarbons can be used as fuel for the two on-site boilers or shipped off site for treatment and disposal. The specifications for the tank are as follows:

Tank	Capacity (gallons)	Length (feet)	Diameter (feet)	Material
T-307	15,000	22	10	Stainless Steel

Waste material is pumped from the generating process to the tank for storage; later the waste material is pumped to the fuel delivery systems of the two boilers or to a tank truck for off-site treatment and disposal. The T-307 tank, pump and piping, are depicted in Figure 5. Tank T-307 dimensions are depicted in Figure 7.

Closure of this unit will be accomplished by removal of all hazardous waste and, to the extent possible through triple rinsing and steam cleaning, waste residue so as to attain a “clean closure.” Closure of the tank is designed to minimize the need for maintenance and eliminate the post-closure escape of hazardous waste to the extent necessary to protect human health and the environment. This standard will be achieved by off-site treatment and disposal of all tank wastes at permitted facilities. Hazardous waste in the tank will be pumped to tank trucks for transportation to the off-site permitted treatment facility.

Decontamination procedures will be carried out once the hazardous waste inventory has been removed. Decontamination will include cleaning of the interior and, if necessary, exterior of the tank and the concrete containment area.

The tank will be triple rinsed with a suitable solvent (e.g., fuel oil or ethylbenzene) followed by two successive steam cleanings to ensure maximum removal of hazardous constituents. The rinsate will be sent off site for treatment at a permitted facility. Rinsing of the tank interiors will be performed manually using a high-pressure spray. Piping to and from the tank will also be flushed with the solvent and the used solvent will be sent off site for treatment at a permitted facility.

Decontamination of the tank interior will be as follows:

- ◆ Lines and piping leading to the tank will be drained and flushed into the tank with a suitable solvent, and this material will be removed and sent off site for treatment and disposal.
- ◆ Interior surfaces will be triple rinsed with a suitable solvent and the rinsate will be removed and sent off site for treatment. The solvent rinse will be followed by two successive steam cleanings to further ensure removal of hazardous waste constituents.
- ◆ After triple rinsing and steam cleaning, the tank will be visually inspected from the exterior (no vessel entry) to determine if any polymer is present that will require physical removal. Any solid residues on the interior of the tank will be physically removed to the extent practical by scraping or suction and containerized for off-site disposal.

Decontamination of the containment area will be as follows:

- ◆ All visible residues in the containment area and tank exterior will be manually or mechanically removed and containerized for off-site disposal to a permitted facility.
- ◆ Containment area surfaces will be steam cleaned until visibly clean. If visible contamination remains, the concrete surface will be removed and containerized for off-site disposal.
- ◆ Rinsate will be collected in the containment sump, directed to the sump manually, or mopped up as necessary. From the sump, the wash water can be pumped into containers or a vacuum truck for shipment to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment, the rinsate will be analyzed for waste classification and disposal requirements.

Following this activity, Dow will visually inspect the containment area and the exterior of the tank for any evidence of past leakage. Any residues will be manually removed from the containment area, or if that is infeasible, residue will be removed by mechanical methods (e.g., sandblasting and/or steam cleaning-power washing) and containerized for off-site disposal at an approved Subtitle C facility. The containment areas will then be steam-cleaned to remove any remaining contaminants, and the rinsate will be containerized and analyzed. Depending upon analytical results, the rinsewater will be shipped to a suitable wastewater treatment plant upon permission to do so from the operator, or shipped to an off-site permitted facility for treatment and disposal.

In order to ensure that hazardous waste and waste residues have been removed to the extent necessary to protect human health and the environment, following initial decontamination, wipe samples of the internal tank surface (confirmation sampling), and core samples of the containment pad and underlying native soil (pavement and soil sampling) will be collected and analyzed for constituents of concern present in hazardous wastes stored in the unit. Detailed plans for the confirmation sampling and pavement and soil sampling are described in Sections 5.5 and 5.6, respectively. Waste fuel constituents detected in wipe, core or soil samples will require an evaluation of risk to human health and the environment or may necessitate additional decontamination or removal of the concrete or soil.

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in a permitted off-site facility. Decontaminated structures may be returned to similar service or demolished down to the base pad. Debris will be removed and disposed of as clean construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site facility.

Any solid hazardous wastes generated during decontamination procedures (i.e., PPE) will be containerized and transported to a permitted off-site facility.

5.4.3 Boiler Area

Two boiler units capable of burning hazardous waste are operated at the Torrance Crenshaw facility. The two boilers and associated pumps and piping are depicted in Figure 6. They can burn a mixture of hazardous waste and natural gas, or they can operate solely on fuel oil or natural gas. The natural gas and

waste mixture is metered to the boiler by independent, calibrated, orifice plate flow meters, as is the fuel oil. The boilers burned both a mixture of hazardous waste and natural gas and at times only natural gas until 1992. Since that time, they have burned natural gas exclusively. Closure of this unit will be accomplished by removal of all hazardous waste and waste residue so as to attain a “clean closure.”

The following bulleted items outline the closure procedures which will be followed during the boiler decontamination activities.

- ◆ The existing waste fuel inventory will be shipped off site for treatment at a permitted facility.
- ◆ Dow will visually inspect the containment area as well as the exterior of the boilers for any evidence of past leakage. Any residues will be removed manually or by mechanical methods (e.g., sandblasting) and containerized for off-site disposal at a permitted facility. The containment area will then be steam-cleaned to remove any remaining contaminants. The rinsate will be containerized and analyzed. Depending upon analytical results, the rinsewater will be shipped to a suitable wastewater treatment plant upon permission to do so from the operator, or shipped to a permitted off-site facility for treatment and disposal.
- ◆ Waste fuel lines leading into the boilers will be flushed with solvent and the rinsate will be sent off site for treatment at a permitted facility.
- ◆ The boilers will be fired with virgin fuel (natural gas) for 24 hours at approximately 65% maximum feed rate.
- ◆ The boiler will be shut down and allowed to cool to facilitate decontamination efforts.
- ◆ Any visible residue will be removed from the outside of the boiler or the concrete containment area, and containerized for off-site disposal to a permitted facility.
- ◆ The exterior of the boiler will be steam cleaned, as well as the concrete containment area. Temporary containment berms or booms will be set up as needed to contain rinsate. The containment area serving the boilers consists of the western half of the surrounding concrete pad, and measures approximately 76 feet by 38 feet.
- ◆ Rinsate will be collected in the containment sumps, directed to the sumps manually, or mopped up as necessary. From the sumps, the washwater can be pumped into containers or a vacuum truck for shipment to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment, the rinsate will be analyzed for waste classification and disposal requirements.

In order to ensure that all hazardous waste and waste residues have been removed, following initial decontamination, wipe samples of the internal boiler surface (confirmation sampling), and core samples of the containment pad and underlying native soil (pavement and soil sampling) will be collected and analyzed for organic hazardous constituents of the waste fuel. Detailed plans for the confirmation sampling and pavement and soil sampling are described in Sections 5.5 and 5.6, respectively. Detection of organic hazardous constituents may require an evaluation of risk to human health and the environment and may constitute the need for remediation or further decontamination or removal prior to closure.

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in permitted off-site facilities. Decontaminated structures may be returned to service or

demolished down to the base pad. Decontaminated debris will be removed and disposed of as clean construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site TSDF.

5.5 CONFIRMATION SAMPLING PLAN FOR STRUCTURES, TANKS, AND EQUIPMENT

At the conclusion of initial decontamination of the tank and boiler areas, confirmation sampling will be conducted to determine the need for further decontamination or remediation of these units. Details of the sampling plan, i.e., number and locations of samples, field sampling methods, quality control samples, chain-of-custody procedures, packaging/preservation and transportation, documentation, and analytical test methods, are provided below.

5.5.1 Tank T-307 and Containment Area

At the conclusion of initial decontamination activities, wipe tests will be performed to determine the need for further decontamination. Wipe tests will be performed at two locations in the tank, as shown in Figure 7. Each location consists of a 100 square centimeter area around the interior of the tank shell. It is anticipated that these wipe tests can be performed from outside the tank using a pole without requiring vessel entry. If vessel entry is unexpectedly required, the HSP will be updated to include vessel entry procedures.

Wipe tests will be performed using cotton swabs moistened in methanol. The swab will be held in a metal clamp and wiped twice in perpendicular directions across the sampling locations using moderate pressure.

The swab will be sealed in a glass jar with a Teflon®-lined cap, and labeled with the tank number and sample location. Chain-of-custody procedures described in Section 5.6.3 will be followed. Samples will be analyzed by a laboratory that holds a current California Department of Health Services Hazardous Waste Certification. Samples will be analyzed for volatile organic compounds by EPA Method 8260B.

The criteria for successful decontamination of the tank is less than $0.025 \mu\text{g}/\text{cm}^2$ for styrene on the swab. $0.025 \mu\text{g}/\text{cm}^2$ is the standard reporting limit for styrene for wipe samples using method EPA 8260B. Styrene was selected as the compound of concern because it has a high concentration in the waste fuel and it is not likely to be present in the decontamination solvent. Other principal organic compounds that are expected to be present in the waste fuel, especially ethylbenzene and benzene, are also expected to be present in fuel oil, ethylbenzene, or other likely decontamination solvents. Therefore, such other compounds are not good candidates for demonstrating that the waste fuel has been removed from the tank, as their presence would only indicate residual solvent from the final internal rinse. If styrene is detected in the wipe sample above the decontamination standard, the decontamination procedure will be repeated.

5.5.2 Boiler Area

At the conclusion of initial decontamination activities, wipe tests of the boiler and samples of the containment pad will be collected to determine the need for further decontamination, as described below.

Wipe tests will be performed on two accessible interior portions of the combustion chamber near where liquid wastes were introduced from the bottom of the boiler. Each wipe sampling location will consist of a 100 square centimeter area. Wipe tests will be performed using cotton swabs moistened in methanol. The swab will be held in a metal clamp and wiped twice in perpendicular directions across the sampling locations using moderate pressure. It is anticipated that these wipe tests can be performed from outside the boilers using a pole without requiring vessel entry. If vessel entry is unexpectedly required, the HSP will be updated to include vessel entry procedures.

The swab will be sealed in a glass jar with a Teflon®-lined cap, and labeled with the boiler number and sample location. Chain-of-custody procedures described in Section 5.6.3 will be followed. Samples will be analyzed by a laboratory that holds a current California Department of Health Services Hazardous Waste Certification. Samples will be analyzed for volatile organic compounds by EPA Method 8260B.

The criteria for successful decontamination of the boiler area is less than $0.025 \mu\text{g}/\text{cm}^2$ for styrene on the swab. $0.025 \mu\text{g}/\text{cm}^2$ is the standard reporting limit for styrene for wipe samples using method EPA 8260B. Styrene was selected as the compound of concern because it has a high concentration in the waste fuel. Other principal organic compounds that are expected to be present in the waste fuel, especially ethylbenzene and benzene, are also expected to be present in fuel oil. Therefore, such other compounds are not good candidates for demonstrating that the waste fuel has been removed from the boiler area. If styrene is detected in the wipe sample above the decontamination standard, further decontamination such as further firing of the boilers using virgin fuel (natural gas) or steam cleaning of the impacted areas may be necessary.

5.6 PAVEMENT AND SOIL SAMPLING PLAN

Following an initial surface decontamination, the pavement or concrete and underlying native soils will be sampled to determine whether additional decontamination will be needed prior to obtaining RCRA closure authorization.

5.6.1 Sample Locations

Proposed concrete sampling locations for the Container Storage Area, Tank T-307 Containment Area, and Boiler Area are illustrated on Figures 8, 9, and 10, respectively. Sampling locations are generally established on grid intervals, as shown on Figures 8 and 10. However, authoritative sampling of visibly contaminated or deteriorated areas will be substituted for grid sampling, to the extent such areas are observed in a given grid. Such areas determined to be subject to authoritative sampling will be photodocumented. Any sampling points that are relocated for authoritative sampling will be described and photodocumented in the final certification report.

5.6.1.1 Container Storage Area

Pavement and underlying native soil will be sampled at seven locations within the containment area, and an additional four samples will be collected within the adjacent loading area, as illustrated on Figure 8. One of the sampling locations within the containment area will be collected beneath the surface drain, which is where any spilled material would be expected to accumulate.

5.6.1.2 Tank T-307 Containment Area

Pavement and underlying native soil will be sampled at four locations within the Tank T-307 containment area, including at the base of a sump located in the northwest corner, which is where any significant amount of spilled material would be expected to accumulate (Figure 9).

5.6.1.3 Boiler Area

Pavement and underlying native soil will be sampled at nine locations within the boiler area. Proposed soil sampling locations will be at grid intervals as illustrated on Figure 10.

5.6.1.4 Background Samples

In order to provide a statistically significant dataset, native soil will be sampled at eight locations in a nearby unpaved recreational area located in the northwest quadrant of the Dow property (see Figure 2), and pavement will be sampled at the eight locations outside the east, south, and west fence line and secondary containment berm of the container storage area (see Figure 8) by coring through the top of the containment berm using the methods described below. These soil and pavement samples will be analyzed for metals as listed in Table 2 and described in Section 5.6.3.3, and will comprise the background samples that are used for determination of clean closure. The soil sampling locations in the recreation area were selected because this area has remained undeveloped at the Facility and is not likely to be impacted by previous operations. The pavement sampling locations just outside the east, south, and west sides of the container storage area were selected since this paved area is outside the container storage area but has similar pavement, likely to be from the same batch and therefore similar in composition, and is not likely to have been impacted by previous operations. The pavement to the north of the container storage area was not selected because it is within an area of vehicle traffic and raw material handling and is therefore less likely representative of background.

5.6.2 Sample Collection Methods**5.6.2.1 Coring Methodology and Sample Collection**

Pavement at each sample location will be cored using a portable electric, pneumatic, or hydraulic drill and a coring bit. The diameter of the coring bit will be approximately 3 inches or larger in order to ensure that core segments are of a sufficient size for analytical testing, and to allow for sampling of underlying soil. The coring bit may be cooled during the cutting process by rinsing or submerging it in distilled water through the core hole. The coring bit will be air-dried as needed to prevent excess water from accumulating in the core hole. The coring bit will be advanced through the floor in two-inch increments. The core will be removed at the completion of each increment using hand tools. The coring bit and hand

tools will be decontaminated after removal of each increment, using a non-phosphate detergent (e.g., liquinox) and deionized water, followed by air-drying.

Pavement core samples will be crushed to produce material that is capable of passing through a 3/8-inch sieve. Size reduction will be performed by cutting, chopping, or crushing with a knife, saw, or hammer. The hand tools, sieve, and the surface where the sample is prepared will be decontaminated between samples with a non-phosphate detergent (e.g., liquinox) and deionized water, and then air-dried.

Upon completion of pavement and soil sampling, the hand augered soil boring beneath the cored pavement will be filled with a cement/bentonite grout while cored pavement section will be filled with a high strength, low shrink grout. The top portion where concrete or asphalt was removed will be coated with asphalt bitumen to match the surrounding surface.

5.6.2.2 Soil Sampling

Native soil beneath the concrete floor will be sampled using a portable hand auger. The hand auger will be advanced in 6-inch increments. The auger cuttings will be removed from the borehole between increments using hand tools and an electric vacuum to prevent soil in the upper interval from contaminating soil in the lower interval. Samples will be collected from 12 to 18 inches bgs and 18 to 24 inches bgs using a slide hammer driven sample barrel lined with 2-inch diameter stainless steel sampling sleeves (or equivalent). The basis for selection of these sampling intervals is that shallow soils are likely to show the greatest impact from spills and releases. Sampling at greater depths, including both soil and groundwater, and possibly soil gas, may be required as a follow-up if impacted soils are revealed at these intervals as described in Section 4.3. Depths shallower than 12 inches were not selected because soils at these depths are often mixed with porous road base during the original facility construction, and such highly permeable material would readily allow any released liquids to migrate to the underlying less permeable soils. Hence, the highest concentrations of any released wastes would most likely be encountered at the proposed sampling depths.

Soil samples retrieved from the sampling barrel will be used for soils classification, organic vapor analyzer (OVA) headspace readings, and chemical testing. Soil will be classified by field personnel in accordance with the Unified Soils Classification System (USCS). Soil headspace concentrations will be obtained by placing soil samples in re-sealable plastic bags and allowing vapors to equilibrate for approximately 15 minutes. The soil vapor headspace will be measured by inserting an OVA probe into the plastic bag. The vapor measurement will be recorded on the soil boring log. Visibly impacted soils observed during sampling activities will be photodocumented where possible.

The soil samples for VOC analysis will be collected using the Encore sampling system per EPA Method 5035 specified in the *USEPA Test Methods for Evaluating Solid Wastes Physical/Chemical Methods SW-846, Version III* (U.S. EPA, 1996) for soil sample preparation and preservation in order to minimize organic losses. The remaining portion of soil will be retained for possible additional chemical analysis. The ends of the sample sleeves will be sealed with Teflon® sheets secured in place with plastic end caps. The samples will be labeled, placed in resealable plastic bags, and stored in an insulated cooler with ice for delivery to a California State Certified Laboratory under chain-of-custody documentation. The

laboratory will receive samples within 24 hours of sampling and analysis will be performed within the allowed holding time.

Upon completion of pavement and soil sampling, the hand augered soil boring beneath the cored pavement will be filled with a cement/bentonite grout while cored pavement section will be filled with a high strength, low shrink grout. The top portion where concrete or asphalt was removed will be coated with asphalt bitumen to match the surrounding surface.

5.6.3 Chain-of-Custody Procedures

Pre-labeled sample containers will be supplied by the laboratory. A unique identifying number will be written on each label by the sampler at the time of sampling.

Field logs consist of chain-of-custody records. Chain-of-custody records are supplied by the laboratory. A sample chain-of-custody form is included in Appendix B. The sampler completes the form, except for the column "Lab Number". Information to be provided on the form includes the sample number, date and time of sampling, preservatives, number and type of containers, and analyses requested.

Sample receipt by the laboratory is documented on the form. A copy of this documentation is returned to Dow by the laboratory.

A unique identification number is assigned to each sample by the laboratory. This number is indicated on the chain-of-custody record, and is used in subsequent reporting of results. Unused portions of samples will be disposed of by the laboratory at permitted facilities.

Analytical results are reported to Dow by the laboratory, using the unique sampling and laboratory numbers assigned to each sample.

Upon collection the soil samples will be labeled with the following information:

- ◆ Sampler's initials and time of sample.
- ◆ Applicable project and site identification information.
- ◆ Sample Identity (Sample ID) - includes boring name and sampling depth interval. For example, a soil boring sample collected from boring CSA-SB-01 from 1.0 to 1.5 feet bgs would be identified as "CSA-SB01-1.5". The replicate sample will be identified with a "D" following the depth (i.e. CSA-SB01-1.5D).

5.6.4 Analytical Test Methods

All analyses will be performed by a certified laboratory. Analytical test methods, sampling locations and depths, type of samples, and sample collection methods are summarized in Table 2. Selected samples will be analyzed for VOCs, which will require sample preparation in accordance with EPA Method 5035. Encore samples will be used in conjunction with VOC analysis by EPA Method 8260B. Select samples

will also be analyzed for metals by EPA Method 6010/7471/7196. Test parameters of each analytical test method are listed in Table 3. Details of analytical methods for each area are provided below.

5.6.4.1 Container Storage Area

Samples will be extracted and analyzed for the hazardous constituents, which may be components of wastes stored in the area.

- ◆ VOCs by EPA Method 8260B;
- ◆ Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, silver, thallium, and zinc by EPA Method 6010;
- ◆ Mercury by EPA Method 7471A; and
- ◆ Chromium VI by EPA Method 7196.

5.6.4.2 Tank T-307 Containment Area and Boiler Area

Samples will be extracted and analyzed for volatile organic hazardous constituents by EPA Method 8260B. This method will cover the hazardous constituents which may be present from hazardous waste residues.

5.6.4.3 Background Samples

The soil and pavement samples will be analyzed for parameters listed in Table 2.

- ◆ Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, silver, thallium, and zinc by EPA Method 6010;
- ◆ Mercury by EPA Method 7471A; and
- ◆ Chromium VI by EPA Method 7196.

5.6.5 Quality Control Samples

Quality control samples will be collected including replicate soil samples (rate of 10%), equipment rinsate blank (drive sampler), and trip blank (one per cooler each day). The equipment rinsate blank will be collected by pouring de-ionized water over the decontaminated equipment, and collecting the rinsate in laboratory supplied glass containers. The purpose of the equipment rinsate blank will be to assess whether or not decontamination procedures were appropriate and evaluate the potential for cross contamination to have occurred. Laboratory prepared trip blanks will accompany soil samples to assess the potential for cross-contamination during sample storage and transport to the laboratory. A laboratory supplied temperature blank will be submitted within each cooler during transport to verify cooler temperature upon arriving at the analytical laboratory. The analytical laboratory will record the temperature immediately upon arrival at the laboratory.

5.6.6 Decontamination of Sampling Equipment

Clean sampling tubes will be used at each soil sample depth. In addition, sampling equipment will be decontaminated between each sampling depth. The decontamination chain will consist of a four-bucket chain, which includes a non-phosphate detergent washing station (e.g. liquinox), initial tap water rinse station, final deionized water rinse station, and air drying station.

5.7 CLOSURE PERFORMANCE STANDARDS (CLEANUP LEVELS)

The goal of the closure plan is to achieve clean closure of the HWMUs. Clean closure is the process where all hazardous waste and hazardous constituent residues are removed or are left in place at levels that are protective of public health and the environment. By achieving clean closure, the Facility would not be subject to further regulatory requirements.

Soil samples will be collected following the procedures outlined in Section 5.6. Quality control, chain-of-custody, labeling, packaging, transportation, and documentation requirements will be followed as described in Sections 5.6, 6.0 and 7.0

The analytical results for metals from individual pavement and soil samples will be compared to background concentrations. For organic compounds, the results cannot be compared to background since background concentrations do not apply to organic chemicals. If any of the metals results exceed background levels, or if any of the organics constituents exceed analytical detection limits, a focused Human Health Screening Evaluation (HHSE) will be completed to assist Dow and/or a regulatory agency in determining whether these data suggest that the Facility poses a significant risk to public health under current and reasonably foreseeable future conditions. Methods used to perform the risk assessment will reflect applicable DTSC and U.S. EPA guidelines.

Dow's evaluation of the sampling results will include potential impact to deeper soils, groundwater, and soil gas and whether further soil sampling, sampling of groundwater, and/or soil gas sampling are required to determine the vertical and lateral extents of impact. In this case, Dow will present such an evaluation in an interim report to the DTSC which includes a work plan for further sampling required as part of this evaluation. Following characterization of the extent of the, soils may be excavated and removed to a permitted off-site facility, or left in place if they pose no unacceptable risk to public health. Remedial activities may also include groundwater and soil gas cleanup if these media are impacted with waste constituents at concentrations that present a risk to human health or the environment and these activities would be described in a follow-up work plan. Details of remediation and disposal procedures for soils are provided in Section 5.8.

Cleanup or removal may be necessary to ensure that no impacted pavement or soil remains that poses an unacceptable risk to human health or the environment. This evaluation, if required, will be conducted as a follow-up to the initial investigation after consultation with the DTSC.

5.8 SOIL REMOVAL/CLEANUP PROCEDURES

In the event that pavement or soil samples analyzed exceed the evaluation criteria specified in Section 5.7 and are found to pose an unacceptable risk to human health or the environment, removal or cleanup will be required so that no impacted pavement or soil remains that poses an unacceptable risk to human health or the environment.

The procedures used to manage impacted pavement or soils will depend on several factors, including the extent of impacted media, the hazardous waste constituents they contain, their location within the HWMUs, physical constraints, and the stability of nearby structures. In general, Dow will plan to remove impacted media to the extent necessary to protect human health and the environment. It is most likely that such impacted media would be shipped off site for treatment and/or disposal at a permitted TSDF following the waste analysis, characterization, and shipping procedures described in Section 4.3.

In the event that pavement or soils must be removed to complete the closure process, Dow will submit a detailed work plan to the DTSC which will include a soils management plan, a map of the HWMU and surrounding area identifying the expected boundaries of the removals, a dust mitigation plan, confirmation sampling plan, waste management plan, and schedule. The HSP will also be updated as necessary to cover the proposed tasks.

5.9 ESTIMATE AND MANAGEMENT OF MAXIMUM ANTICIPATED WASTE INVENTORY

During this closure process, hazardous wastes will be generated consisting of soil cuttings generated during hand auger usage, wastewater generated during decontamination, and used PPE. The waste will be temporarily containerized prior to final disposition at an appropriately permitted off-site facility. A waste label will be maintained on each container along with general information including generation date/location, contents, contact information, and a statement “pending analytical testing.” The waste handling procedures are described in the following sections.

5.9.1 Soil Cuttings

The soil cuttings will be temporarily stored in 55-gallon drums and/or closed top bins within a waste accumulation area established by field personnel. The bins will contain plastic liners and will remain closed during non-operating hours. Upon completion, one composite sample will be submitted to a laboratory for chemical analysis to obtain a waste profile prior to final disposition at an appropriately permitted off-site waste facility.

5.9.2 Wastewater

The closure plan provides for decontamination of equipment using solvent rinsing and steam cleaning. Solvent wastes and decontamination water will be temporarily contained in separate 55-gallon drums. Samples of the decontamination fluids will be submitted to a laboratory for chemical analysis to obtain a waste profile prior to final disposition at an appropriately permitted off-site waste facility.

5.9.3 Personal Protective Equipment

The PPE generated during this investigation will be containerized in 55-gallon drums within the waste accumulation area established by field personnel. The waste will accompany other waste during final disposition at an appropriately permitted off-site facility.

5.9.4 Maximum Anticipated Waste Inventory

The following outlines the maximum inventory of hazardous wastes potentially on site at the HWMUs at a given point during the active life of the Facility:

- ◆ Container storage area - 30,000 gallons (≈600 drums);
- ◆ Tank storage area - 15,000 gallons (Tank T-307 maximum capacity); and
- ◆ Boilers - Included in storage tank above.

This maximum inventory is based on the permitted waste capacity of the HWMUs. This would represent the maximum amount of hazardous waste that would have to be removed (managed) from the HWMUs and shipped off site to a permitted facility for treatment and/or disposal prior to beginning decontamination activities.

As described in Sections 5.4, 5.6, and 5.8 above, potentially hazardous wastes will be generated during closure activities. These wastes will include solvents and rinsewater from decontamination of the HWMUs, their associated equipment, and secondary containment areas. They may also include miscellaneous pieces of equipment that cannot be decontaminated, although this is not expected. Note that the current plan is to continue to utilize the equipment for non-waste service (boilers) or as 90-day hazardous waste generator facilities (Container Storage Area and Tank T-307). Finally, wastes will be generated from concrete and soil cuttings generated during subsurface sampling activities and from PPE used by field personnel. Note that the concrete and soil cuttings are not expected to be hazardous wastes, but are included as such for purposes of assessing the maximum hazardous waste inventory.

The following summarizes the maximum inventory of hazardous wastes expected to be generated during closure activities:

- ◆ Rinsate (solvent, condensed steam, and rinsewater from equipment decontamination) – 16,100 gallons;
- ◆ Equipment that cannot be decontaminated – 3 tons; and
- ◆ Concrete and soil cuttings from sampling activities, and PPE – 1,500 pounds.

These wastes will be managed by shipping them off site to a permitted facility for treatment and/or disposal. Closure cost estimates presented below include off-site management of these quantities of hazardous waste for maximum (worst-case) cost purposes.

Should the estimated maximum waste inventory change, Dow will follow the procedures for a class 1 modification as required under CCR Title 22.

5.9.5 Management of Waste Inventory

The inventory of wastes stored on site in the HWMUs will be shipped off site to a permitted facility prior to beginning decontamination activities. Similarly, hazardous wastes generated during closure activities will also be shipped off site to a permitted facility following waste characterization and within 90 days of generation. Wastes will be analyzed as necessary following the procedures outlined in the Facility's Waste Analysis Plan, which is included in the RCRA Part B Permit Application, Section III. The wastes will be profiled, characterized based on analytical data and process knowledge, then shipped to the off-site permitted facility for treatment and/or disposal after the Facility reviews the profiles and notifies Dow that their permits will allow them to accept the wastes. As discussed in Section 4.2 above, permitted off-site TSDFs that may receive Dow's wastes are currently located throughout California and the surrounding region. At the time of closure, Dow will select appropriate disposal facilities based on permit status, treatment technologies, price, potential future liabilities, and other factors. One facility that is currently capable of receiving Dow's wastes is Veolia Environmental Services in Azusa, California. The distance to this facility from Torrance is about 38 miles.

Dow will include appropriate manifests, nonhazardous waste data forms, required land disposal restriction notifications, and any other required paperwork to accompany all off-site shipments of wastes. Copies of these documents will be maintained in the facilities files. It is not known at this time which treatment or disposal methods will be used to manage each waste shipped to off-site TSDFs, but it is assumed for cost estimating purposes that rinsewaters will undergo wastewater treatment, contaminated equipment will be landfilled, and solvents, concrete and soil cuttings, and PPE will be incinerated. Fuels blending or recycling of such wastes will generally result in lower costs, so the more expensive treatment and disposal technologies were selected for closure cost estimating purposes.

5.10 CLOSURE COSTS/ESTIMATES

Dow developed a detailed closure cost estimate as part of the RCRA Part B Permit Application requirements. This closure cost estimate was provided in Section XI.D of Dow's RCRA Part B Permit Application. The detailed closure cost estimate is also provided in this Work Plan.

The closure cost estimates outlined in Tables 4, 5, and 6 equal the cost of final closure of individual units at the point in plant operations when the extent and manner of the Facility's operations would make closure the most expensive. The closure costs include off-site management of the maximum inventory of hazardous waste from each HWMU. The maximum hazardous waste inventory is provided in Section 5.9.4. Closure costs have been developed for all regulated units, and are summarized in Table 7. The estimates are based upon hiring a third party (who is neither a parent nor a subsidiary of the owner or operator) to close the Facility.

No salvage values from the sale of hazardous or nonhazardous wastes, facility structures or equipment, land or other assets associated with the Facility at the time of partial or final closure are included. No zero costs for hazardous wastes have been incorporated.

The closure costs are adjusted for inflation annually as required by 22 CCR 66264.142 and 40 CFR 264.142 to account for inflation by using an inflation factor derived from the annual Implicit Price Deflector for Gross National Product, published by the U.S. Department of Commerce. Although the closure costs presented in Tables 4, 5, 6, and 7 are based on 1992 cost estimates, Dow has updated these costs annually as required under RCRA financial responsibility and submitted these updated costs to both the DTSC and the U.S. EPA. The latest (2006) financial assurance information for both closure care and liability costs is provided as Appendix C.

5.11 FINANCIAL RESPONSIBILITY

Dow's financial responsibility compliance as required under CCR Title 22 and CFR Title 40 is described in Section XII of the RCRA Part B Permit Application.

Dow uses the financial test to demonstrate financial assurance for future closure costs. Dow uses one mechanism for multiple facilities, including the Torrance, California facility. The wording of the latest letter demonstrating financial assurance through the use of the financial test is substantially identical to the wording specified in 40 CFR 264.151 (g). The latest (2006) financial assurance information for both closure care and liability costs is provided as Appendix C.

The subject facility does not have hazardous waste land disposal units or other HWMUs requiring post-closure care. Therefore, these costs are not included in the financial assurance submittals for Dow's Torrance facility.

Dow uses the financial test to demonstrate coverage for both sudden and non-sudden accidental occurrences. Dow maintains liability coverage for sudden accidental occurrences in the amount of \$1 million per occurrence with an annual aggregate of \$2 million. Dow maintains liability coverage for non-sudden accidental occurrences in the amount of \$3 million per occurrence with an annual aggregate of \$6 million.

Dow's fiscal year ends December 31. As required, Dow updates its financial assurance documents by no later than March 31 following the end of the fiscal year.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

The purpose of a Quality Assurance/Quality Control (QA/QC) program is to ensure that data is scientifically valid, defensible, and of known precision and accuracy. The QA/QC program shall:

- ◆ Provide a mechanism for ongoing control and evaluation of measurement data quality.
- ◆ Provide measures of data quality in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC). These criteria are used to assess whether the data can be used for their intended purpose.

6.1 QUALITY ASSURANCE (QA) PROGRAM

The QA program addresses both field and laboratory activities and represents an independent assessment of the project or activities incorporated into the project. The QA process is the management system that ensures an effective QC system is in place and working as intended, and assures that defined standards of quality within a stated level of confidence are met. The PARCC parameters or quality assurance objectives (QAOs) for each field effort will vary based on the intended use of the data. The basis for assessing the PARCC parameters is discussed below.

6.1.1 Precision

Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value. Precision is estimated by means of duplicate/replicate analyses. These samples should contain concentrations of analyte above the method detection limit (MDL), and may involve the use of matrix spikes (MSs). When only two samples are available, then the most commonly used estimate of precision is the relative percent difference (RPD).

$$\text{Precision} = \frac{\text{Relative Percent Difference}}{\text{Difference}} (RPD) = \frac{X_1 - X_2}{[X_1 + X_2]/2} \times 100$$

where:

X_1 = Sample 1 result

X_2 = Sample 1 pair result

6.1.2 Accuracy

Accuracy is the closeness of agreement between an observed value and an accepted reference value. When applied to a set of observed values, accuracy includes components of random error (variability due to imprecision) and systematic error. Analytical accuracy is typically measured by determining the percent recovery of known target analytes that are spiked into a field sample (a surrogate spike or a matrix spike) or reagent water (laboratory control sample or method blank spike) before extraction at a known concentration. Surrogate spike recovery is reported and is used to assess method performance for each sample analyzed for volatile and semi-volatile compounds. The stated accuracy objectives apply to spiking levels at least five times the instrument/analyte/sample-specific detection limits.

$$\text{Accuracy} = \text{Percent Recovery (\%R)} = 100 (X_s - X_u) / K$$

where:

X_s = measured value for spiked sample,

X_u = measured value for unspiked sample, and

K = known value of the spike in the sample.

Additional factors affecting accuracy such as calibration, analyte identification and quantitation will also be reviewed. Furthermore, as an additional measure of accuracy, an audit in the form of performance evaluation (PE) samples will be conducted. Blank, low-level, and high-level PE samples will be prepared, and then shipped double blind along with the field samples to the certified environmental laboratory for analysis using the same methods as those referenced for the field samples.

6.1.3 Representativeness

Representativeness measures how accurately the sample data reflect the actual media and environmental conditions being measured. Objectives for representativeness are functions of the investigative objectives. For example, sampling locations that are representative of the medium being sampled will be chosen. Sampling protocols will be developed to ensure that samples collected represent the actual medium and that no contamination is introduced during sample collection. Proper sample handling and preservation will be observed in the field to ensure that the samples maintain their integrity while being transported to the laboratory for analysis.

6.1.4 Comparability

Comparability reflects the internal consistency of the measurements and how well the data set can be compared to another data set. The objectives for this QA/QC program are to produce data with the greatest possible degree of comparability. Comparability of data will be achieved by using standard methods for sampling and analysis, reporting data in standard units, using standard reference materials, using equivalent acceptance criteria and maximum reporting limits (MRLs), using certified environmental analytical laboratories, and flagging data using a consistent set of rules.

6.1.5 Completeness

Completeness is defined as the percentage of data that are within the acceptance criteria for a given data set and are, therefore, considered valid. Completeness is measured by comparing the total number of acceptable parameters (valid data) against the total number of parameters analyzed. Valid or acceptable data consists of parameters that meet the QC acceptance criteria and parameters that were estimated and qualified as “J” and can still be used for their intended purpose. The project objective for completeness is 95% for aqueous samples and 90% for soil samples.

Completeness is calculated using the following equation:

$$\frac{100 (\text{Total number of results} - \text{Number of suspect ("S") and unusable, rejected, ("R") results})}{\text{Total number of results}}$$

6.2 QUALITY CONTROL (QC) PROGRAM

The elements of a QC program include those field and laboratory activities performed by and/or incorporated into the performance of a project team. QC consists of the internal technical, day-to-day activities that control and assess the quality of the measurements. The purpose of the program is to ensure that technical services provided meet applicable and appropriate quality specifications that satisfy the needs and expectations of the project.

6.2.1 Field Quality Control

6.2.1.1 Field Duplicates

Field duplicate samples are independent samples that are collected as close as possible to the same point in space and time. They are two separate samples taken from the same source, stored in separate containers, and analyzed independently. Duplicate sample results are used to document the precision of the sampling process. Duplicate samples will be collected simultaneously or in immediate succession, using identical recovery techniques, treated in an identical manner during storage, transportation and analysis, assigned separate sample numbers, and submitted blind (without identity) to the laboratory.

Duplicate sample collection and analysis will be performed at a frequency of 10% for each method and matrix. Sample locations for collection of field duplicate samples can be identified when the sequence of sampling locations are determined, so that field duplicate collection will take place evenly over the course of the field effort. Before sample collection, the Field Manager will designate specific locations for the collection of the field duplicate samples.

These values are based on the expected and acceptable precision; however, if these tolerances are exceeded and both sampling procedures appear acceptable and laboratory variability is within acceptable tolerance (indicated by matrix spikes and duplicate sample RPD results), then sample heterogeneity is the probable cause. Data will be flagged, indicating that the variability between the measurements is higher than expected.

6.2.1.2 Blank Samples

Blank samples are control samples that must be collected to check for possible cross-contamination during sample collection, shipment, and analysis. Several types of blanks will be used to monitor for cross-contamination during this closure and field investigation and include equipment blanks, trip blanks, and method blanks. These samples are collected, numbered, packaged, and sealed in the same manner as the other samples. Equipment blanks and trip blanks are discussed in further detail below, and method blanks are described in Section 8.2.2.5.

Equipment Blank

An equipment blank is a sample of analyte-free media that has been used to rinse the sampling equipment. It is collected after completion of decontamination and prior to sampling. This blank is useful in documenting adequate decontamination of sampling equipment. Equipment blanks will be collected at a frequency of one per day per matrix type.

Analytes in equipment blanks should be less than the MRL. If these concentrations are exceeded, an assessment of the sampling and decontamination procedures will be performed. Any possible sources of field contamination will be investigated and the frequency of equipment blanks increased until the problem is identified and corrected.

Trip Blank

A trip blank is a sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. A trip blank is used to document contamination attributable to shipping and field procedures. This type of blank is useful in documenting VOC contamination that may occur while the samples are in transit from the sampling site to the laboratory. Trip blanks will be submitted at a frequency of one per day for each day that VOC analyses are required.

Analytes in trip blanks should be less than the MRL. If this concentration is exceeded, an assessment of the sample transportation and storage procedures will be performed. Any possible source of contamination will be investigated until the problem is identified and corrected.

6.2.2 Laboratory Quality Control

Laboratory QC is achieved by collecting and/or analyzing a series of duplicate, replicate, blank, spike, and spike duplicate samples to ensure that the analytical results are within the tolerances specified for the program. QC samples prepared in the laboratory are documented at the bench and reported with the analytical results. Laboratory QC samples include: calibration check standards, laboratory control samples (LCSs), matrix spikes (MSs), surrogate spikes (SSs), method blanks (MBs), and laboratory duplicates. Section 7.8 provides a discussion on laboratory QC samples.

Overall, the laboratory QC sample results are used to quantify precision and accuracy and identify any problems or limitations in the associated sample results. These components of the sampling program will ensure that data of known quality are produced throughout sampling and analysis programs. Periodic laboratory QC measures include:

- ◆ Instrument calibration, including multi-point calibration and continuing calibration verification;
- ◆ MDL studies, which are performed annually, or after major instrument maintenance for some methods;
- ◆ Demonstration of capability, performed annually for each analyst and often as a second source check following multipoint calibration; and
- ◆ Recalibration and/or retention time window studies as necessary after major instrument maintenance.

Laboratory QC is necessary to control the analytical process, to assess the accuracy and precision of analytical results, and to identify assignable causes for suspect data. The QC samples for each analytical method generally include the use of the QC samples discussed below; some types of QC samples are specific to the method. Laboratories performing analyses for this field effort are required to adhere to the analytical QC procedures. In particular, calibration and laboratory control samples/laboratory control

sample duplicate criteria must be met to demonstrate that the analytical instrument and method are in control and can produce data of sufficient quality to meet the objectives of the site investigation.

6.2.2.1 Calibration Check Standard

The calibration curve is a reproducible reference point at which sample measurements can be correlated. A continuing calibration check standard is used to determine the status of the calibration curve for an instrument between periodic recalibrations. An initial calibration is required as per each analytical method by analyzing a specified number of calibration standards that contain each analyte of interest and that cover the entire concentration range expected. These calibration standards are also used to determine the linearity of calibration for the instrument. The reported concentration of an analyte in a sample, sample extract, or diluted sample must not exceed the boundaries of the working calibration range. This is governed by the concentrations associated with the highest initial calibration standard for each analyte of interest.

Initial and continuing calibration verification standards (ICVs and CCVs) containing each analyte of interest are analyzed daily to verify that the initial calibration curve or response factors demonstrate acceptable performance of the analytical instrument. The results of the ICVs or CCVs must meet acceptance criteria before sample analysis may proceed. ICV and CCV criteria must be met or the associated data will be qualified as “R,” rejected.

6.2.2.2 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

LCSs and LCSDs are samples of a known matrix spiked with compound(s) representative of the target analytes. These samples are used to document laboratory performance. LCS/LCSDs are analyzed for each analytical method when appropriate for the method. An LCS/LCSD pair will be analyzed to verify that the precision and bias of the analytical process are within control limits. The results of the LCS/LCSDs are compared to control limits established for both precision and bias to determine usability of the data.

The precision and accuracy objectives for this investigation were established for each method to ensure internal consistency and comparability of data collected during the field efforts. The objectives must be met for the analytical method to be considered in control. The accuracy and precision of each analytical method will be monitored using a subset of the analyte list for methods with multiple analytes. The recovery and RPD tolerances for Level III analyses are based on the following:

- ◆ The level of accuracy and precision needed for risk assessment;
- ◆ Performance-based specifications for the laboratories expected to perform analyses for the investigation; and
- ◆ Accuracy and precision data specified in the method, to provide a measure of what is realistically achievable.

Each analyte with acceptance criteria in both the LCS and LCSD must meet the acceptance criteria for accuracy, and the RPD for each analyte must meet the precision criteria. If one or more analytes do not meet the criteria, the method is considered out-of-control, and corrective action must be taken. The

corrective action for LCS/LCSDs that do not meet the tolerance limits is to analyze a third LCS. If two of three LCSs still do not comply, each associated sample should be repeated or reported with qualifiers.

6.2.2.3 Matrix Spike/Matrix Spike Duplicates (MS/MSDs)

A MS is an aliquot of sample spiked with a known concentration of target analyte(s). A MSD is an intralaboratory split sample spiked with identical concentrations of target analyte(s). For both of these laboratory QC samples, spiking occurs prior to sample preparation and analysis. These QC samples are used to document the precision and bias of a method in a given sample matrix.

When appropriate for the method, there will be at least one matrix spike and either one matrix duplicate or one matrix spike duplicate per analytical batch.

6.2.2.4 Surrogate Spike (SS)

A SS is an organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in the environmental samples. A known concentration of the surrogate compound will be added to each of the standards, blanks, and samples before analysis. The recovery of the compound will be compared to the control limits specified in the QA objective for each organic method in order to evaluate the performance of the analytical system and to determine if there is any matrix interference affecting the method performance. Samples with unacceptable surrogate recoveries will be reanalyzed and, if the results of the reanalysis are still outside the control limits, then the poor recovery is most likely associated with a matrix effect if acceptable surrogate recoveries were obtained in the method blank and the laboratory control sample analyses.

Non-detected results for samples with surrogate recoveries less than 10% will be rejected and qualified as “R”. Detected results for samples with surrogate recoveries less than 10% will be qualified as suspect, “S”.

6.2.2.5 Method Blank (MB)

A MB consists of an analyte-free matrix to which each reagent is added in the same volumes or proportions as used in sample processing. It is carried through the complete sample preparation and analytical procedure. MBs are used to document contamination resulting from the analytical process. MBs will be analyzed at a frequency of once per preparation batch.

The concentration of any analyte in a method blank must be less than the MRL. The corrective action for MBs that exceed allowable concentrations is to reanalyze the blank; if contamination still exceeds the allowable concentration, then the source of the contamination must be identified and corrected, and the blank and associated samples must be prepared again and reanalyzed. If the associated sample concentrations are not detected or are greater than ten times the blank concentration, the results will be reported without qualification. Any associated sample concentrations that are less than ten times that which was detected in the MB sample will be qualified as suspect (“S”).

6.2.3 Data Quality Objectives

6.2.3.1 Method Reporting Limit (MRL) for Wipe Samples

As described in Sections 5.5.1 and 5.5.2, the criteria for successful decontamination of tank T-307 and the boiler area is less than $0.025 \mu\text{g}/\text{cm}^2$ for styrene on the wipe test swab. $0.025 \mu\text{g}/\text{cm}^2$ is the standard reporting limit for styrene for wipe samples using method EPA 8260B and this will be the minimum reporting limit for the wipe testing.

6.2.3.2 Background Soil Sampling

Results for metals testing from the background soil and asphalt samples will be statistically screened to determine if the number of samples in each case was sufficient and whether the background and on-site results are similar to or different from each.

6.3 MAXIMUM REPORTING LIMITS

MRLs established for this project are based on:

- ◆ The statistically calculated instrument detection limits that can be achieved;
- ◆ EPA Region 9 PRGs and California maximum contaminant levels (MCLs); and
- ◆ The detection limits documented in the method or instrument manufacturers' literature.

Analytical results for groundwater samples will be compared to PRGs and MCLs. PRGs and MCLs are risk-based concentrations derived from standardized equations, combining exposure information assumptions and EPA toxicity data. PRGs provide an estimate of contaminant levels considered acceptable in a given environment (e.g., industrial area, residential area) and medium (e.g., soil and/or water). MCLs provide an estimate of contaminant levels considered acceptable in drinking water. PRGs and MCLs are meant to be used as a screening tool, and should not be taken alone as cleanup goals without further evaluation of the site-specific remediation needs.

At a minimum, data will be reported to the laboratory-derived MDL for each analyte. For the majority of analyses, results will be reported to the instrument/analyte/sample-specific detection limit. These detection limits are calculated by multiplying instrument-specific MDLs (described below) by factors resulting from concentration, dilution, and moisture content. Assuming no dilution has been performed and the moisture content is zero, the detection limits reported in the analytical report will be less than or equal to the MRLs. The reported detection limits will increase with dilutions and moisture content and may exceed MRLs when these factors are considered.

6.4 METHOD DETECTION LIMITS (MDLs)

The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The laboratory performs detection

limit studies on an annual or quarterly basis (depending on the method) to demonstrate that it can meet the project MRLs. The U.S. EPA procedure used for establishing detection limits is described in 40 CFR 136.

6.5 QUANTITATION LIMITS

A quantitation limit is the lowest concentration at which an analyte can be accurately measured and reported without qualification as an estimated quantity. The quantitation limit is an instrument specific limit, whereas the MRL is the criterion established for a method. The quantitation limit for these investigations is defined as three times the instrument/sample-specific detection limit (DL) or the concentration of the lowest calibration standard, whichever is lowest. This quantitation limit is not statistically based, but is meant to provide the data users with a general guideline for the uncertainty associated with the reported results. Results at or below the quantitation limit will be flagged as estimated concentrations due to the higher variability of concentrations near the detection limit. Data above the quantitation limit will be used for risk assessment, if needed.

7.0 DATA MANAGEMENT

Adherence to the procedures described below will ensure that complete documentation is maintained, transcription and data reduction errors are minimized, the data are reviewed and documented, and the reported results are properly qualified.

7.1 LABORATORY DATA REDUCTION, REVIEW, AND REPORTING

The laboratory analyst has the primary responsibility for performing analyses that meet method and project QA/QC specifications, data reduction, and documenting information pertinent to sample analysis and data quality. After sample analysis, raw data will be reviewed by a laboratory supervisor or peer reviewer to verify that the analytical batch meets specifications.

The hard copy and electronic laboratory reports for each sample and analysis will contain the information required to perform a thorough data evaluation. At a minimum, the following information will be included:

- ◆ Chain-of-custody form;
- ◆ Chain-of-custody addendum (specifies the condition of the cooler upon receipt);
- ◆ Field identification number;
- ◆ Date received;
- ◆ Date prepared;
- ◆ Date analyzed;
- ◆ Method;
- ◆ Result for each analyte (and surrogate);
- ◆ MDL;
- ◆ Units;
- ◆ Laboratory qualifier flags (for data that do not meet project QC specifications);
- ◆ Narrative, if necessary;
- ◆ MS and laboratory control spike concentrations;
- ◆ MS and laboratory control spike results;
- ◆ MS and laboratory control spike recoveries and RPDs;
- ◆ MB results;
- ◆ Any other QC sample results;
- ◆ Initial and continuing calibrations;
- ◆ Analytical batch number; and
- ◆ Preparation batch number.

Complete documentation of sample preparation and analysis and associated QC information will be maintained by the laboratory for project samples in a manner that allows easy retrieval in the event that additional validation or information is required.

7.2 DATA REPORTING FOR FIELD METHODS

Data packages will be prepared for groundwater field analyses. These analyses include pH, conductivity, temperature, and turbidity. The breathing zone around the groundwater monitoring wells will be monitored periodically using an organic vapor monitor (OVM). The data packages will include, at a minimum, the following information:

- ◆ Instrument operator;
- ◆ Date collected;
- ◆ Date analyzed;
- ◆ Method;
- ◆ Result for each analyte;
- ◆ Units; and
- ◆ Calibration logs:
 - Instrument number,
 - Instrument calibrator,
 - Date and time calibrated,
 - Precalibration and postcalibration measurements, and
 - Calibration standards.

7.3 PROJECT DATA FLOW AND TRANSFER

Data flow from the laboratory and field to the project staff and the data users will follow established procedures to ensure that the data are properly tracked, reviewed, and validated for use. The field data will be entered into a master field log, and chain-of-custody forms will be prepared for submittal to the laboratory with the samples. The field data are verified after entry into the database by comparison with field data sheets and notebooks.

The electronic analytical data from the laboratory will be submitted with hard-copy reports and uploaded to the project database by using a set of programs to read, check, and match the analytical results to the field data in the database. The electronic results will be reviewed by project staff to ensure accurate reporting and adherence to project and method reporting requirements. Electronic results will be reviewed for correct sample identification, dates, reporting limits, quality control flags, and agreement between the hard copy and electronic data. After the analytical reports are used to verify the electronic transfer process, they will be permanently stored in project files.

Corrections or edits may be handled by requesting reissuance of laboratory electronic deliverables, or by providing the data management staff with the required changes. The correction mechanism depends upon the types of corrections or changes needed. Analytical information request forms or database validation forms will be used to request these changes, track the status, and document each request. After the field and laboratory results have been evaluated, qualifier flags are entered into the database, and the results will be accessible to data users.

Any data received from the analytical laboratories that do not provide electronic data will require manual entry. A data entry verification check will be conducted and any errors identified by the check will be corrected.

7.4 REPORTING

A Closure Certification Report (Report) will be prepared describing the activities conducted during the RCRA closure. The report will include a discussion of the site decontamination and subsurface sampling processes conducted. The report will also include the following documentation:

- ◆ Certification by an independent registered professional engineer;
- ◆ Supervisory personnel description;
- ◆ Summary of closure activities;
- ◆ Field Engineer Observation Reports;
- ◆ Sampling data and analyses including sampling locations, soil boring logs, chain-of-custody forms, analytical results, and laboratory analytical reports;
- ◆ Discussion of analytical results;
- ◆ Manifests showing disposition of waste inventory;
- ◆ Modifications and amendments to the Closure Plan (if applicable); and
- ◆ Photographs.

In addition, the following documentation will be maintained at the Facility and made available to the DTSC upon request:

- ◆ Approved Closure Plan;
- ◆ A copy of the independent qualified professional engineer's field observation reports;
- ◆ Laboratory results of samples analyzed;
- ◆ QA/QC demonstrations;
- ◆ Documentation of disposition of waste inventory;
- ◆ Miscellaneous documentation such as photographs; and
- ◆ Closure Certification Report.

The Report, signed by both a Dow representative and by the certifying engineer, will be submitted to the DTSC by registered mail within 60 days of the completion of the closure activities.

The approved closure plan with approved revisions, and the latest closure cost estimate will be kept at the Facility until final closure is completed and certified.

8.0 REFERENCES

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U.S. EPA, SW-846 Method, <http://www.epa.gov/epaoswer/hazwaste/test/main.htm>

Tables

Table 1. Facility Hazardous Wastes

Waste ID #	Name of Hazardous Waste	Monthly Avg. Qty (lbs)	Annual Avg. Qty (lbs)	Process of Generation	Handling S = Solid L = Liquid	Disposition	Hazardous Properties	EPA (CA) Waste Codes
2903	Azepoxy-8	50	500	Epoxy Resin Mfg. Spill/Off-Spec Material	PE Drums (S)	Incineration	Toxic	NA (343)
2904	Acetone	50	500	Epoxy Resin Mfg. Spill	PE Drums (S)	Incineration	Ignitable	U002/D001 (212)
2905	Epoxy Filters	1,000	10,000	Epoxy Resin Mfg. Filter Change	PE Drums (S)	Incineration	Ignitable	D001 (272)
2906	Empty Sacks (T-Brom)	12,500	15,000	Epoxy Resin Mfg. Raw Material Packaging	PE Drums (S)	Incineration	Toxic	NA (513)
2907	Glass Jars with Resin	100	1,000	Epoxy Resin Mfg. Sample Jars	PE Drums (S)	Incineration	Toxic	NA (272)
2908	Lab Waste (Styron)	300	3,500	Polystyrene Mfg. Lab Samples	PE Drums (S)	Incineration	Toxic, Ignitable	D001/D018 (551)
2914	Process Waste	1,100	13,000	Polystyrene Mfg. Spills/Samples	PE Drums (S)	Incineration	Toxic, Ignitable	D001/D018 (272)
2922	Charcoal (spent)	500	6,000	Epoxy Resin Mfg. Carbon Absorber	PE Drums (S)	Incineration	Toxic, Ignitable	U002/D001/D018 (352)
2924	Empty Bags (Zinc Stearate)	200	2,000	Polystyrene Mfg. Raw Material Packaging	PE Drums (S)	Incineration	Toxic	NA (513)
2927	Brominated Resin	1,200	14,000	Epoxy Resin Mfg. Spills	PE Drums (S)	Incineration	Ignitable	D001 (272)
2929	Contaminated Clothing	65	750	Plant Wide Used Clothing	PE Drums (S)	Incineration	Toxic	NA (352)
2932	Kerosene	50	500	Plant Wide Spill	PE Drums (S)	Incineration	Combustible	D001/D018 (213)
2934	Dowtherm® (Heat Transfer Fluid)	300	3,200	Resin Mfg. Spill/Spent Fluid	PE Drums (S)	Incineration	Toxic	NA (343)
2938	Feed Filters	400	4,500	Polystyrene Mfg. Filter Change	PE Drums (S)	Incineration	Toxic	D018 (352)
2939	Filter Waste (Demister)	100	1,200	Polystyrene Mfg. Filter Change	PE Drums (S)	Incineration	Toxic	D018 (243–352)
2940	Lube Oil (Absorbed)	450	5,000	Resin Mfg. Used Oil/Spill	PE Drums (S)	Incineration	Toxic	D018 (221)
2941	Zinc Stearate	400	4,500	Polystyrene Mfg. Process/Spill	PE Drums (S)	Incineration	Toxic	NA (352)

Table 1 (Continued)

Waste ID #	Name of Hazardous Waste	Monthly Avg. Qty (lbs)	Annual Avg. Qty (lbs)	Process of Generation	Handling S = Solid L = Liquid	Disposition	Hazardous Properties	EPA (CA) Waste Codes
2942	Plastic Buckets with Resin	75	250	Epoxy Resin Mfg. Used Buckets	PE Drums (S)	Incineration	Toxic	NA (513)
2943	Lab Waste (Epoxy)	75	600	Epoxy Resin Mfg. Lab Samples	PE Drums (S)	Incineration	Ignitable	D001 (551)
2944	Catalyst (A-1)	50	500	Epoxy Resin Mfg. Spill	PE Drums (S)	Incineration	Ignitable	D001 (343)
2946	Printing Ink	150	1,500	Styrofoam® Mfg. Residual/Spill	PE Drums (S)	Incineration	Ignitable	D001 (343)
2947	Trichloroethane (1,1,1-)	100	1,000	Plant Wide Degreasing Solvent	PE Drums (S)	Incineration	Toxic	F002 (211)
2960	Mercapton	150	1,700	Polystyrene Mfg. Spill	PE Drums (S)	Incineration	Toxic	NA (343)
2962	Catalyst (SPD)	50	500	Polystyrene Mfg. Raw Material Spill	PE Drums (S)	Incineration	Toxic, Ignitable	D001/D018 (343)
2964	Xylene	50	500	Epoxy Resin Mfg. Spill	PE Drums (S)	Incineration	Toxic	D018/U239 (213)
2965	EG with Boric Acid	50	500	Epoxy Resin Mfg. Spill	PE Drums (S)	Incineration	Toxic	NA (343)
019572	Scrubber Water	10,000	100,000	Epoxy Resin Mfg. Scrubber Change Out	Steel Drums (L)	Recycle	Ignitable	D001 (133)
019573	Water with Dowtherm®	2,000	20,000	Plant Wide Equipment Cleaning	Steel Drums (L)	Recycle	Toxic	NA (134)
019687	SPD Process Water	7,000	80,000	Polystyrene Mfg.	SS Totes (L)	Recycle	Toxic, Ignitable	D001/D018 (133)
013154	Used Oil	2,000	25,000	Plant Wide Equipment Draining	Steel Drums (L)	Fuels Blend	Toxic	F002/D018 (741)
019663	Styrene	2,500	30,000	Polystyrene Mfg. Off-Spec/Spill	Steel Drums (L)	Fuels Blend	Ignitable	D001 (271)
202697	EG/Water	1,000	13,000	Polystyrene Mfg. Spill	Steel Drums (L)	Recycle	Toxic	NA (134)
202791	Dowtherm® A	1,000	10,000	Resin Mfg. Spent Fluid	Steel Drums SS Totes (L)	Fuels Blend	Toxic	D018 (343)
202644	Ethylbenzene	2,500	30,000	Polystyrene Mfg.	Steel Drums (L)	Fuels Blend	Toxic, Ignitable	F003/D001/D018 (213)
202622	Recovered Hydrocarbons	128,000	1,500,000	Polystyrene Mfg.	T-41, T-307, T-599 (L)	Boiler Fuel, Fuels Blend, Incineration	Ignitable, Toxic	D001/D018 (272)

Table 1 (Continued)

Waste ID #	Name of Hazardous Waste	Monthly Avg. Qty (lbs)	Annual Avg. Qty (lbs)	Process of Generation	Handling S = Solid L = Liquid	Disposition	Hazardous Properties	EPA (CA) Waste Codes
GM89-2007	Asbestos	1,000	10,000	Plant Wide Asbestos Abatement	PE Drums, Rolloff (S)	Landfill	Toxic	NA (151)
OP10765	Paint	300	3,000	Plant Wide Painting	PE Drums (S)	Incineration	Toxic	NA (461)
GM91-2403	Sand Blast Grit	500	5,000	Sandblasting	PE Drums (S)	Landfill	Toxic	D008 (181)

Table 2
Summary of Sampling Plan
RCRA Closure Work Plan
Dow Crenshaw Facility, Torrance, California

Location	Depth	Number of Samples	Sampling Method	Type of Sample	Analytical Method	Container
T-307 Tank	tank surface	2	Wipe Test	cotton swab	EPA Method 8260A	glass jar with Teflon-lined cap
Boiler combustion chambers	accessible interior portion	4	Wipe Test	cotton swab	EPA Method 8260A	glass jar with Teflon-lined cap
CSA and adjacent loading area	0-2 inches 2-4 inches 4-6 inches	TBD*	Coring	pavement	EPA Method 8260B	Glass jars
CSA and adjacent loading area	0-2 inches 2-4 inches 4-6 inches	TBD*	Coring	pavement	EPA Methods 6010B, 7471A, and 7196A	Glass jars
CSA and adjacent loading area	12-18 inches	11	Hand augering	soil	EPA Method 8260B	Encore
CSA and adjacent loading area	12-18 inches	11	Hand augering	soil	EPA Methods 6010B, 7471A, and 7196A	Glass jars or stainless sample sleeves
CSA and adjacent loading area	18-24 inches	11	Hand augering	soil	EPA Method 8260B	Encore
CSA and adjacent loading area	18-24 inches	11	Hand augering	soil	EPA Methods 6010B, 7471A, and 7196A	Glass jars or stainless sample sleeves
T-307 Area	0-2 inches 2-4 inches 4-6 inches	TBD*	Coring	pavement	EPA Method 8260B	Glass jars
T-307 Area	12-18 inches	4	Hand augering	soil	EPA Method 8260B	Encore
T-307 Area	18-24 inches	4	Hand augering	soil	EPA Method 8260B	Encore
Boiler Area	0-2 inches 2-4 inches 4-6 inches	TBD*	Coring	pavement	EPA Method 8260B	Glass jars
Boiler Area	12-18 inches	9	Hand augering	soil	EPA Method 8260B	Encore
Boiler Area	18-24 inches	9	Hand augering	soil	EPA Method 8260B	Encore
Background - CSA corners	0-2 inches 2-4 inches 4-6 inches	TBD*	Coring	pavement	EPA Methods 6010B, 7471A, and 7196A	Glass jars
Background - Recreation Area	12-18 inches	4	Hand augering	soil	EPA Methods 6010B, 7471A, and 7196A	Glass jars or stainless sample sleeves
Background - Recreation Area	18-24 inches	4	Hand augering	soil	EPA Methods 6010B, 7471A, and 7196A	Glass jars or stainless sample sleeves

Note:
All samples will be analyzed by a certified laboratory.

TBD = To be determined.

* Will be determined by the pavement thickness.

Table 3. List of Analytical Methods and Compounds
RCRA Closure Plan
Dow Crenshaw Facility, Torrance, California

Method	Analyte
EPA 6010B	Antimony
	Arsenic
	Barium
	Beryllium
	Cadmium
	Chromium, total
	Cobalt
	Copper
	Lead
	Molybdenum
	Nickel
	Selenium
	Silver
	Thallium
	Vanadium
	Zinc
EPA 7471A	Mercury
EPA 7196A	Hexavalent Chromium
EPA 8260B	Acetone
	Benzene
	Benzyl Chloride
	Bromodichloromethane
	Bromoform
	Bromomethane
	Carbon Disulfide
	Carbon Tetrachloride
	Chlorobenzene
	Chlorodibromomethane
	Chloroethane
	Chloroform
	Chloromethane
	cis-1,2-Dichloroethene
	cis-1,3-Dichloropropene
	Dibromochloromethane
	Dichlorodifluoromethane
	Dichlorotetrafluoroethane
	Ethylbenzene
	Hexachloro-1,3-Butadiene
	Methylene Chloride
	Methyl-t-Butyl Ether (MTBE)
	o-Xylene
	p/m-Xylene
	Styrene
	Tetrachloroethene
	Toluene
	trans-1,2-Dichloroethene
	trans-1,3-Dichloropropene
	Trichloroethene
	Trichlorofluoromethane
	Vinyl Acetate

Table 3. List of Analytical Methods and Compounds
RCRA Closure Plan
Dow Crenshaw Facility, Torrance, California

Method	Analyte
EPA 8260B (cont.)	Vinyl Chloride
	1,1,1,2-Tetrachloroethane
	1,1,1-Trichloroethane
	1,1,2,2-Tetrachloroethane
	1,1,2-Trichloro-1,2,2-Trifluoroethane
	1,1,2-Trichloroethane
	1,1-Dichloroethane
	1,1-Dichloroethene
	1,2,4-Trichlorobenzene
	1,2,4-Trimethylbenzene
	1,2-Dibromoethane
	1,2-Dichlorobenzene
	1,2-Dichloroethane
	1,2-Dichloropropane
	1,3,5-Trimethylbenzene
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	2-Butanone
	2-Hexanone
	4-Ethyltoluene
	4-Methyl-2-Pentanone

Note:

All samples will be analyzed by a certified laboratory.

Table 4. Closure Cost Estimate for Storage Tanks

(Source: ENSR, 1992)

No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
1	Remove, transport, treat (recycle) or dispose maximum inventory				
	Disposal	20000	gallons	\$1.15	\$23,000
	Transportation	4	5000-gal tanker	\$1,000.00	\$4,000
	Subtotal				\$27,000
2	Decontaminate equipment, containment system (steam cleaning)				
	Tank (labor)	16	hours	\$70.00	\$1,120
	Tanks (equipment)	1	day	\$924.00	\$924
	Containment system (labor)	5200	sq. ft.	\$1.00	\$5,200
	Containment system (equipment)	1	day	\$100.00	\$100
	Rinseate collection (labor)	8	hours	\$70.00	\$560
	Tinseate collection (equipment)	30	days	\$20.00	\$600
	Analytical (Disposal purposes)	2	sample	\$1,000.00	\$2,000
	Rinseate Transportation (5,200 gal from containment, 1,000 gal from tanks)	2	5000-gal tanker	\$1,000.00	\$2,000
	Rinseate Disposal				
	Subtotal	6200	gallons	\$2.00	\$12,400
					\$24,904
3	Removal of decontaminated equipment, structures, contaminated systems components				
	Removal/transportation charged by recyclers	4	tons	\$25.00	\$100
	Removal of non-hazardous waste	8	hours	\$35.00	\$280
	Transport/Disposal to landfill	1	ton	\$160.00	\$160
	Subtotal				\$540
4	Wipe sampling and analysis of 2 tank interiors (2 samples/tank)				
	4 Wipe Samples (labor)	4	hour	\$78.00	\$312
	Analytical Subtotal	4	sample	\$300.00	\$1,200
					\$1,512
5	Pavement and soil sampling and analysis for concrete and the soil beneath the concrete for each boring location (up to 12 inches in depth and 4 samples per boring)				
	10 Borings (Labor)	1.5	hour/boring	\$78.00	\$1,170
	Borings (equipment)	2	day	\$100.00	\$200
	Analytical Subtotal	40	sample	\$300.00	\$12,000
					\$13,370

Table 4 (Continued)

No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
6	Closure certification				
	Independent certification	10	hours	\$180.00	\$1,800
	engineer's closure oversight				
	Certified engineer's report	4	hours	\$40.00	\$160
	Clerical support	3	hours	\$25.00	\$75
	Subtotal				\$2,035
7	Total costs				\$69,361
8	10 percent Contingency				\$6,936
9	Grand Total				\$76,297

Table 5. Closure Cost Estimate for Boilers

(Source: ENSR, 1992)

No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
1	Remove, transport, treat (recycle) or dispose maximum inventory	NA			
2	Decontaminate equipment, containment system (steam cleaning)				
	Boilers (labor)	8	hours	\$70.00	\$560
	Boilers (equipment)	1	day	\$924.00	\$924
	Containment system (labor)	2888	sq. ft.	\$1.00	\$2,888
	Containment system (equipment)	1	day	\$100.00	\$100
	Rinseate collection (labor)	8	hours	\$70.00	\$560
	Rinseate collection (equipment)	30	days	\$20.00	\$600
	Analytical (Disposal purposes)	2	sample	\$1,000.00	\$2,000
	Rinseate Transportation (2,888 gal from containment, 100 gal from tanks)	1	5000-gal tanker	\$1,000.00	\$1,000
	Rinseate Disposal	2988	gallons	\$2.00	\$5,976
	Subtotal				\$14,608
3	Removal of decontaminated equipment, structures, contaminated systems components				
	Removal/transportation charged by recyclers	4	tons	\$25.00	\$100
	Removal of non-hazardous waste	8	hours	\$35.00	\$280
	Transport/Disposal to landfill	1	ton	\$160.00	\$160
	Subtotal				\$540
4	Wipe sampling and analysis of combustion chamber and boiler				
	4 Wipe Samples (labor)	4	hour	\$78.00	\$312
	Analytical Subtotal	4	sample	\$300.00	\$1,200
					\$1,512
5	Pavement and soil sampling and analysis for concrete and the soil beneath the concrete for each boring location (up to 12 inches in depth and 4 samples per boring)				
	12 Borings (Labor)	1.5	hour/boring	\$78.00	\$1,404
	Borings (equipment)	3	day	\$100.00	\$300
	Analytical Subtotal	48	sample	\$300.00	\$14,400
					\$16,104

Table 5 (Continued)

No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
6	Closure certification				
	Independent certification	10	hours	\$180.00	\$1,800
	engineer's closure oversight				
	Certified engineer's report	4	hours	\$40.00	\$160
	Clerical support	3	hours	\$25.00	\$75
	Subtotal				\$2,035
7	Total costs				\$34,799
8	10 percent Contingency				\$3,480
9	Grand Total				\$38,279

Table 6. Closure Cost Estimate for Container Storage Areas

(Source: ENSR, 1992)

No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
1	Remove, transport, treat (recycle) or dispose maximum inventory				
	Disposal	600	55-gal. drums	\$255.00	\$153,000
	Transportation	15	trucks	\$350.00	\$5,250
	Subtotal				\$158,250
2	Decontaminate equipment, containment system (steam cleaning)				
	Containment system (labor)	6900	sq. ft.	\$1.00	\$6,900
	Containment system (equipment)	1	day	\$100.00	\$100
	Rinseate collection (labor)	8	hours	\$70.00	\$560
	Rinseate collection (equipment)	30	days	\$20.00	\$600
	Analytical (Disposal purposes)	2	sample	\$1,000.00	\$2,000
	Rinseate Transportation (6,900 gal from containment)	2	5000-gal tanker	\$1,000.00	\$2,000
	Rinseate Disposal	6900	gallons	\$2.00	\$13,800
	Subtotal				\$25,960
3	Removal of decontaminated equipment, structures, contaminated systems components				
	Removal/transportation charged by recyclers	1	tons	\$25.00	\$25
	Removal of non-hazardous waste	8	hours	\$35.00	\$280
	Transport/Disposal to landfill	1	ton	\$160.00	\$160
	Subtotal				\$465
4	Pavement and soil sampling and analysis for asphalt and the soil beneath the asphalt for each boring location (2 areas) (up to 12 inches in depth and 4 samples per boring)				
	20 Borings (Labor)	1.5	hour/boring	\$78.00	\$2,340
	Borings (equipment)	4	day	\$100.00	\$400
	Analytical	80	sample	\$500.00	\$40,000
	Subtotal				\$42,740

Table 6 (Continued)

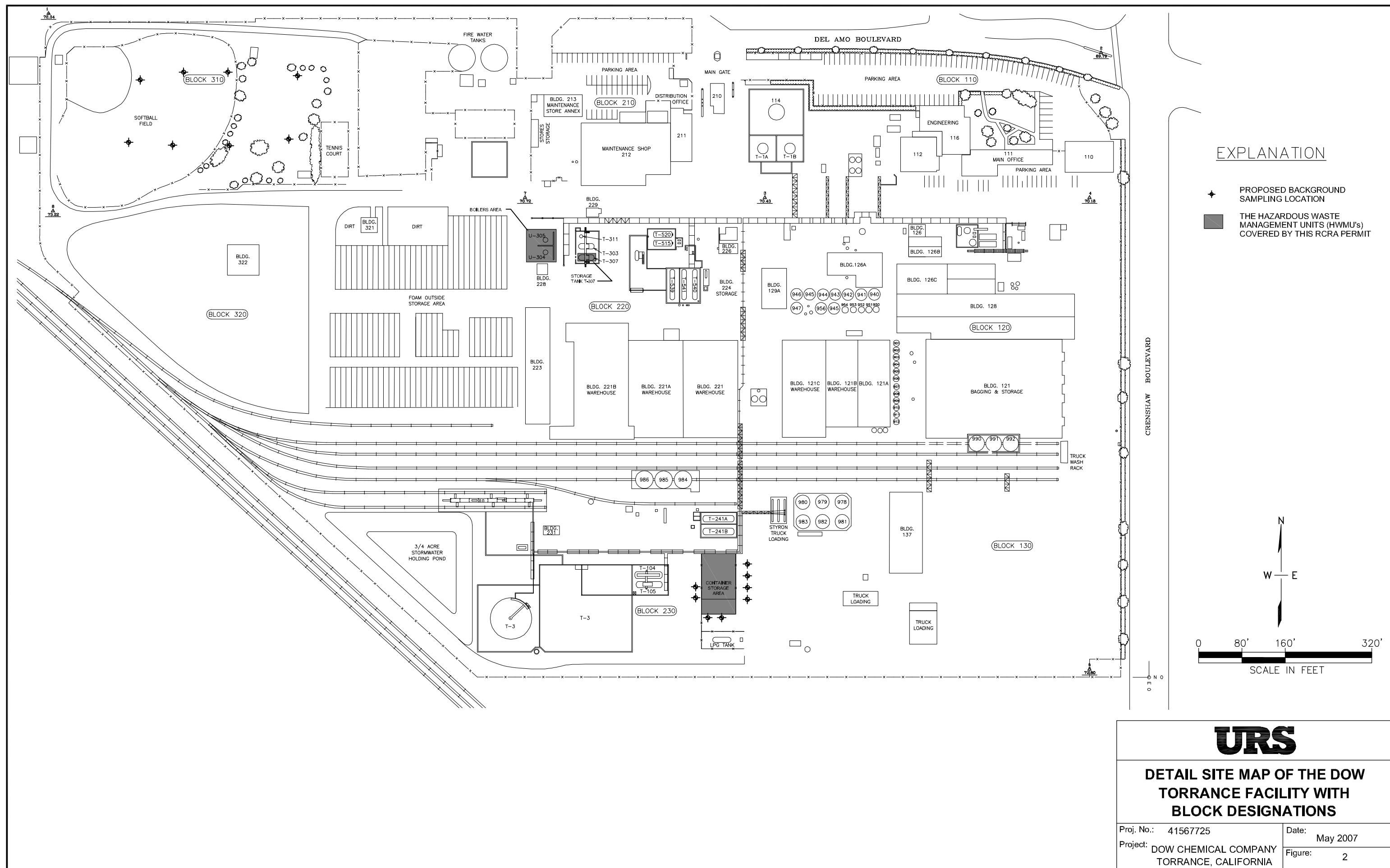
No.	Activity	Amount/Number	Units of Measure	Unit Cost	Total Cost
5	Background pavement and soil sampling and analysis for asphalt for each boring location (up to 12 inches in depth and 4 samples per location)				
	4 Borings (Labor)	1.5	hour/boring	\$78.00	\$468
	Borings (equipment)	1	day	\$100.00	\$100
	Analytical	16	sample	\$500.00	\$8,000
	Subtotal				\$8,568
6	Closure certification				
	Independent certification engineer's closure oversight	10	hours	\$180.00	\$1,800
	Certified engineer's report	4	hours	\$40.00	\$160
	Clerical support	3	hours	\$25.00	\$75
	Subtotal				\$2,035
7	Total costs				\$238,018
8	10 percent Contingency				\$23,802
9	Grand Total				\$261,820

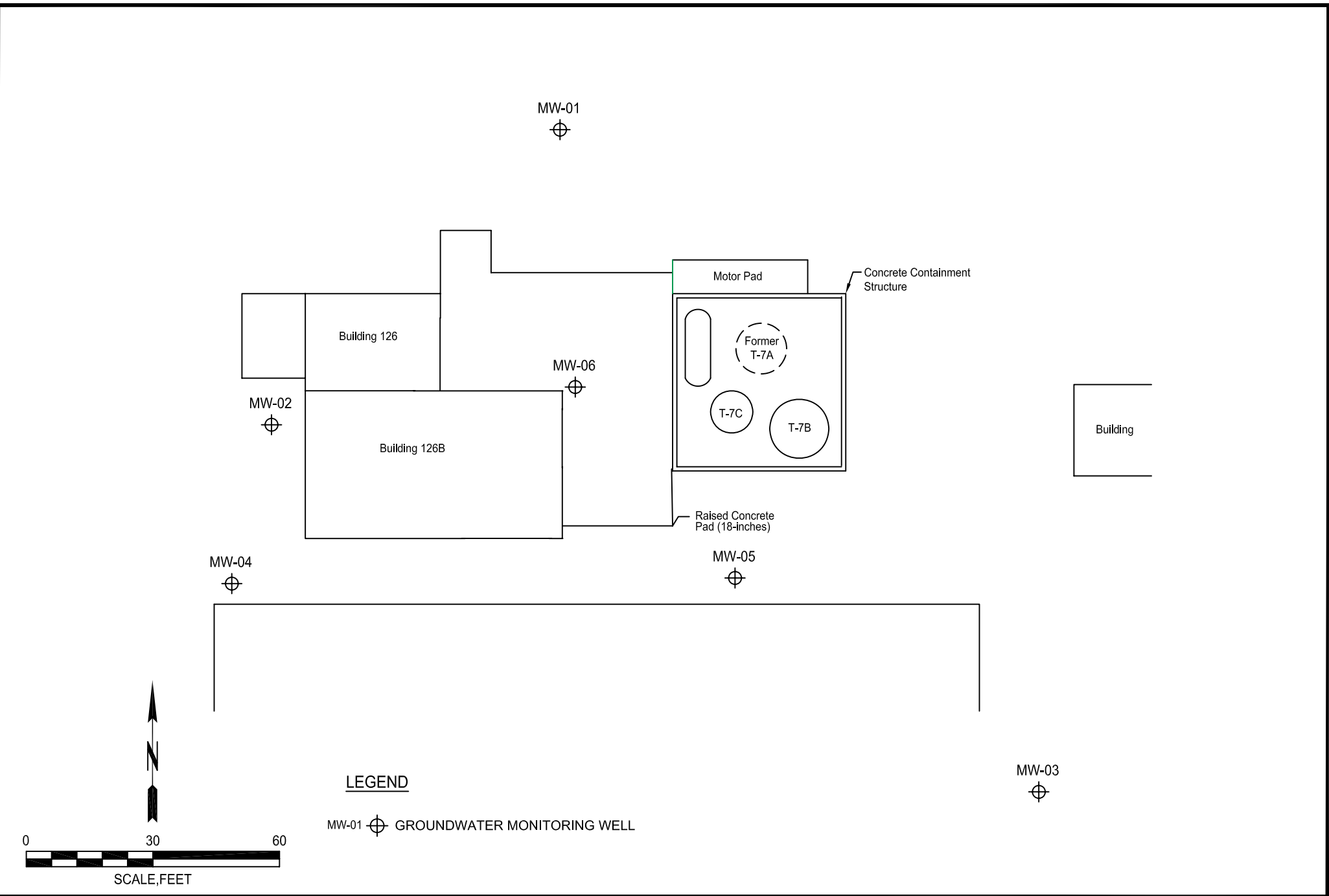
Table 7. Total Closure Cost Estimate (1992 \$)
The Dow Chemical Company, Torrance, CA

(Source: ENSR, 1992)

Hazardous Waste Management Unit and Estimated Closure Cost (1992 \$)	
Storage Tank Nos. 41 and 307	\$76,297
Boiler U-304 and U-305	\$38,279
Container Storage Area	\$261,820
Total Closure Cost Estimate	\$376,396

Figures





GROUNDWATER MONITORING WELL LOCATIONS

Project No.: 41567512

Date: JULY 2005

Project: DOW TORRANCE CRENSHAW

Fig. 3

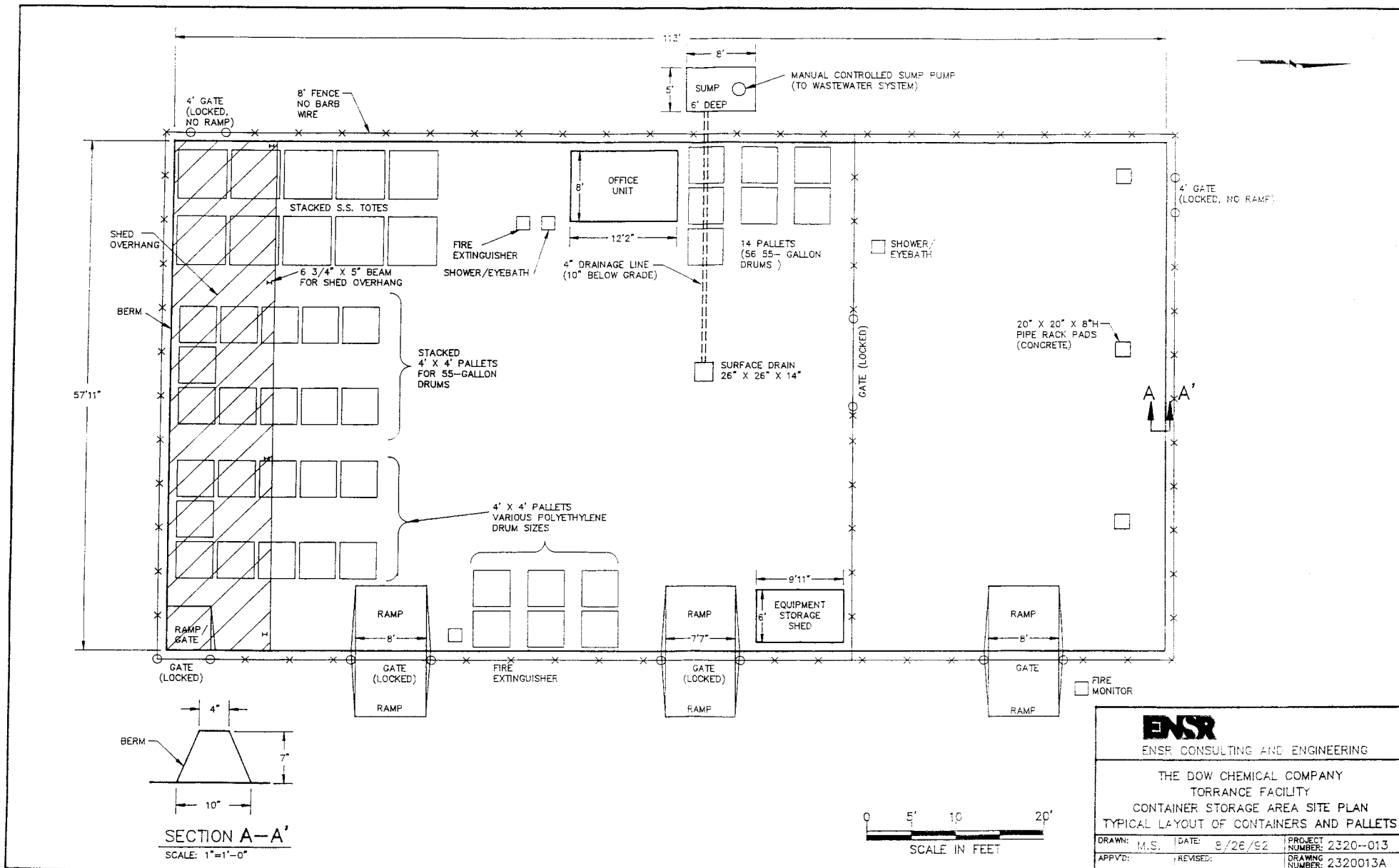


Figure 4

P & ID - T-307 HAZARDOUS WASTE STORAGE

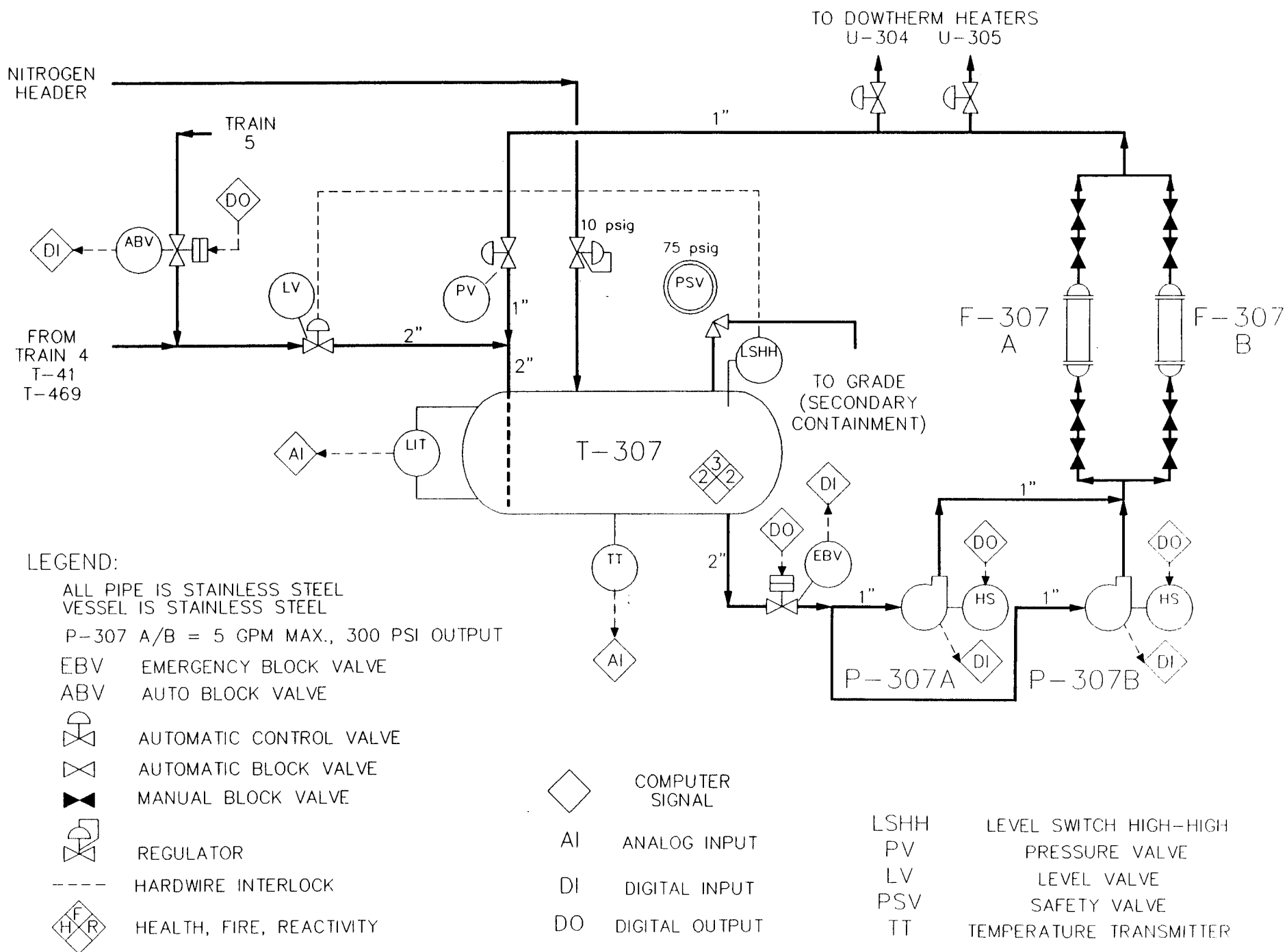


Figure 5

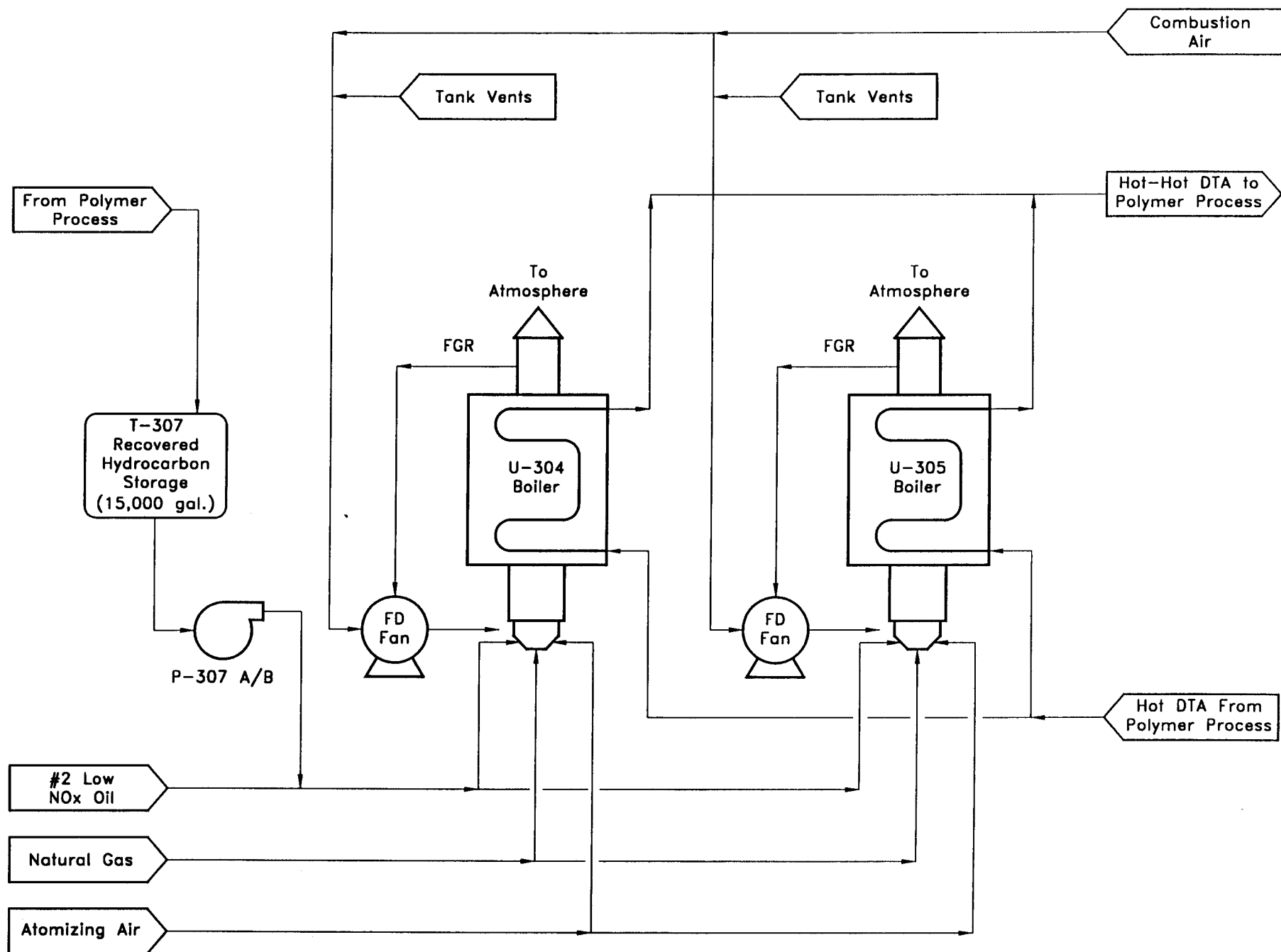
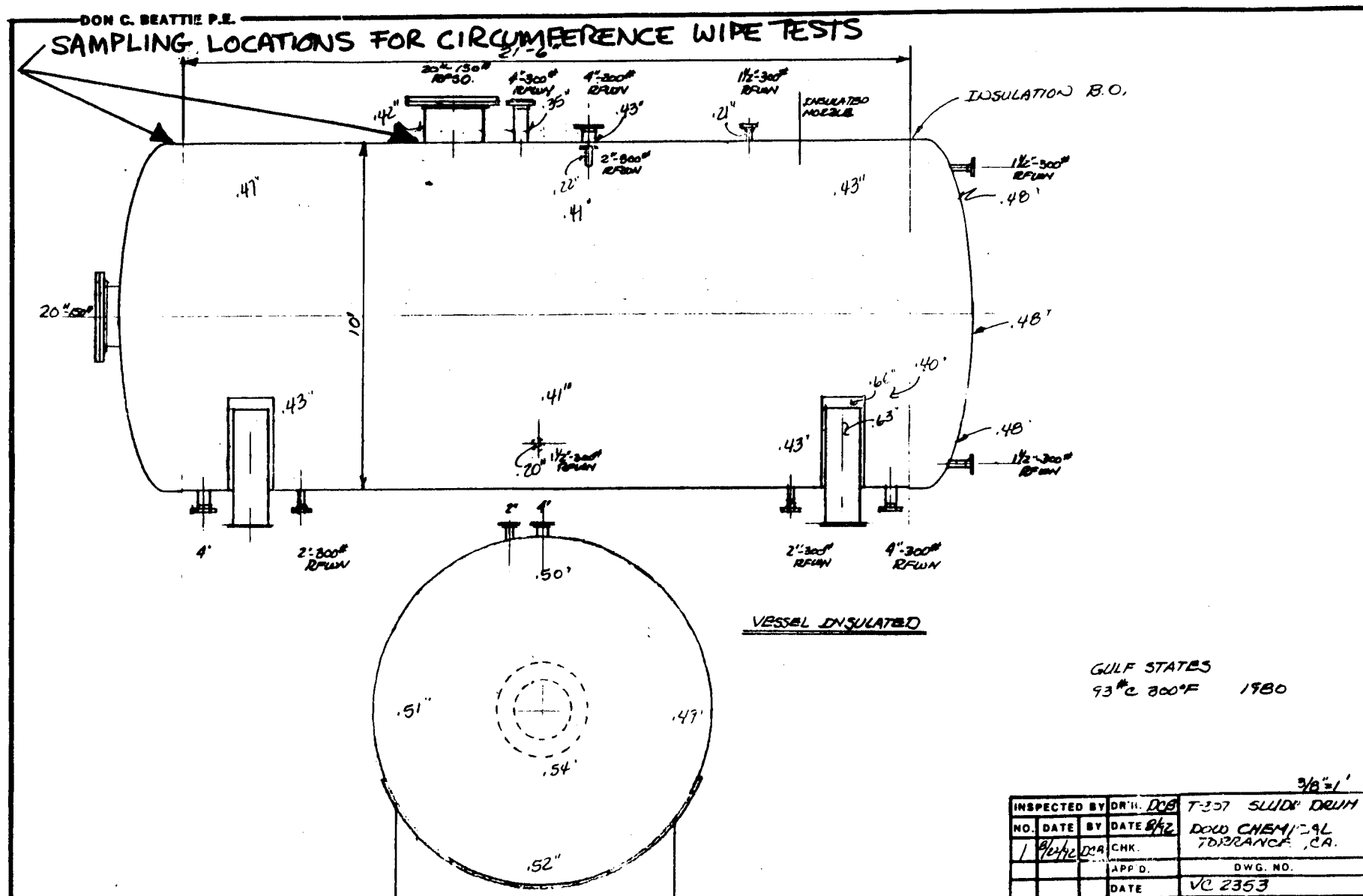
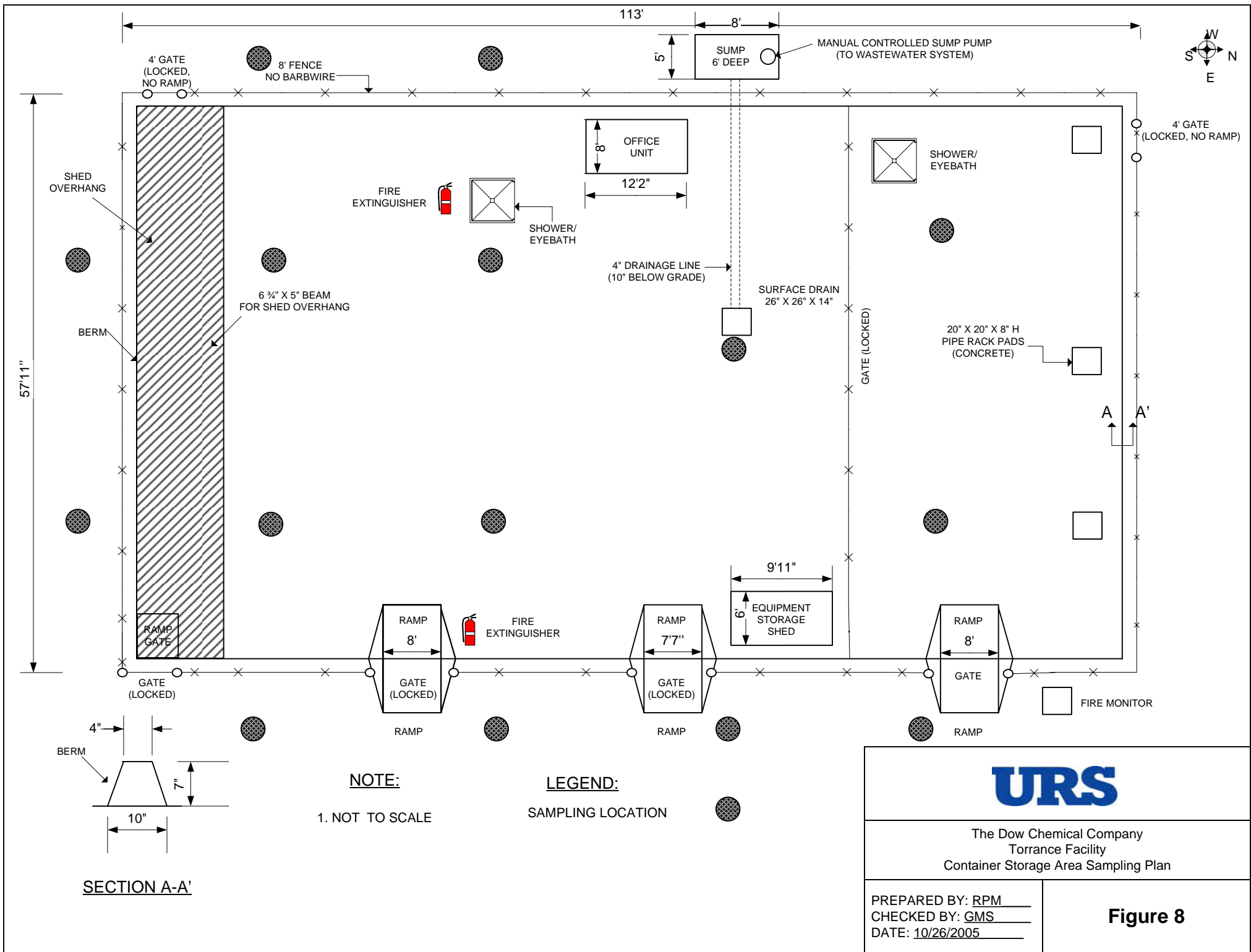


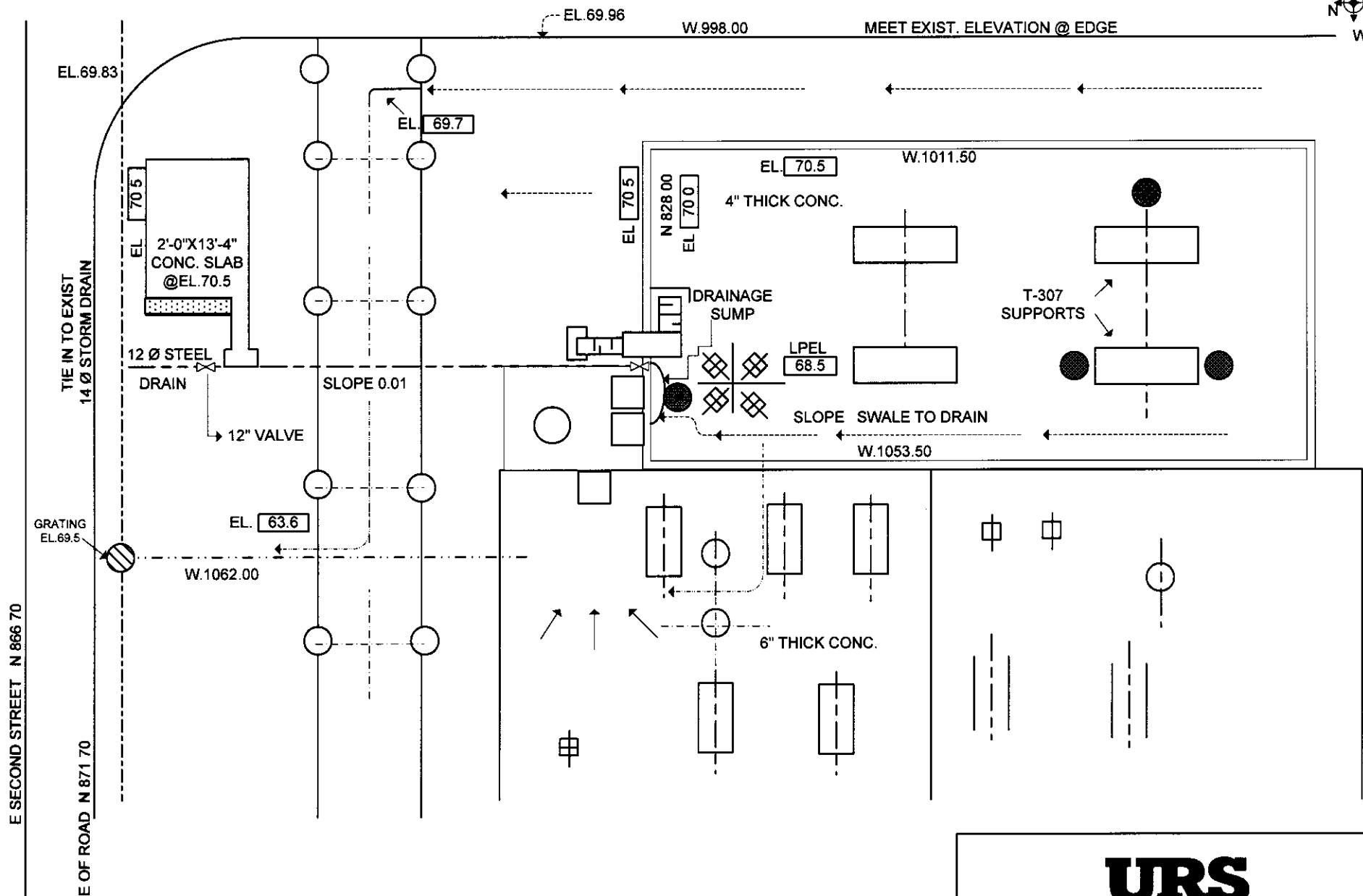
Figure 6. Boiler Schematic Diagram



18750 CORDATA FOUNTAIN VALLEY, CA 92708 (714)962-6789

Figure 7. Sampling Locations for T-307 Circumference Wipe Tests





NOTE:

1. NOT TO SCALE

LEGEND:

SAMPLING LOCATION

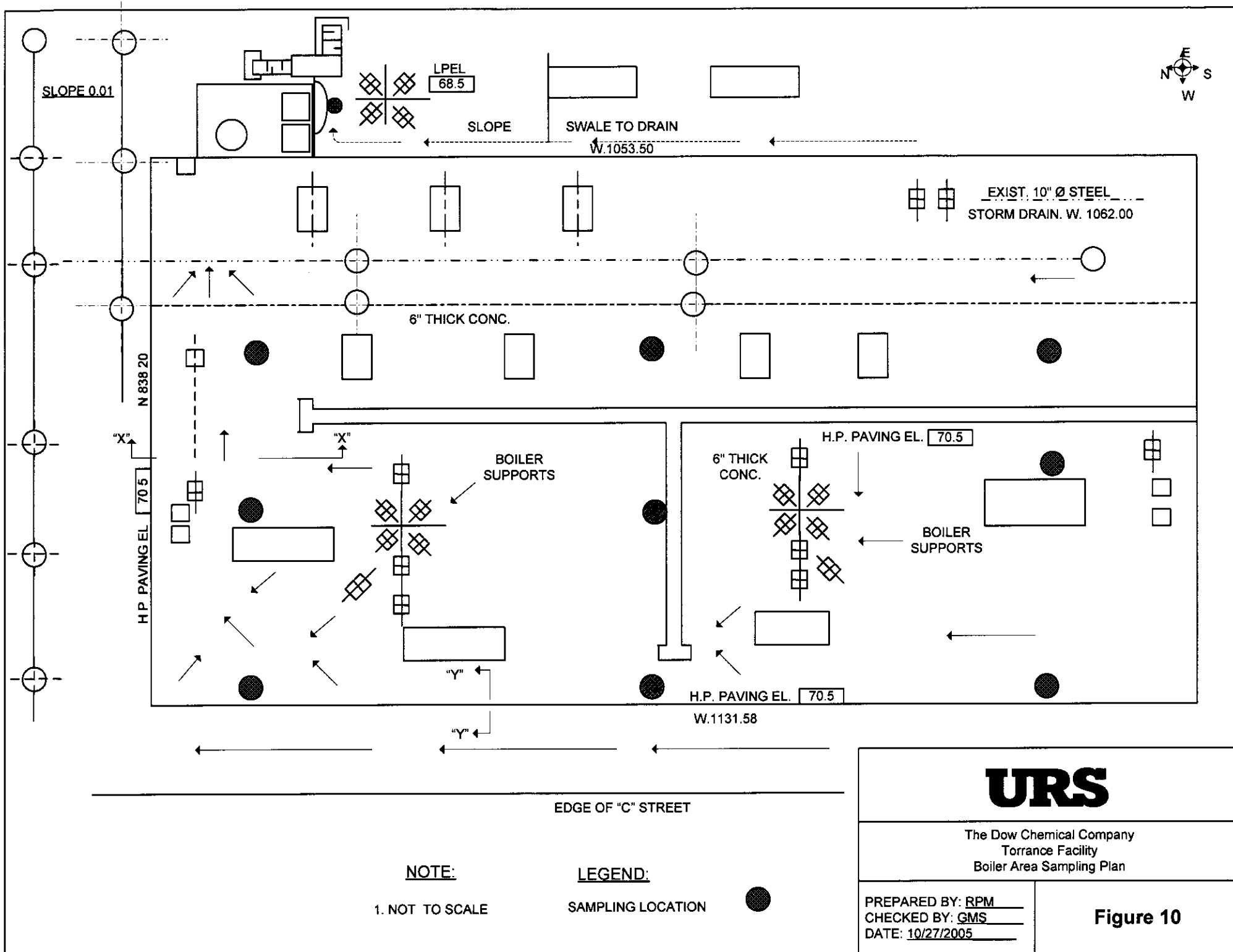


URS

The Dow Chemical Company
Torrance Facility
T-307 Containment Area Sampling Plan

PREPARED BY: RPM
CHECKED BY: GMS
DATE: 10/27/2005

Figure 9



Appendix A

Modified RCRA Facility Closure Plan (November 2005) and DTSC NOD

Modified Closure Plan with Attachments

XI. Closure Plan

A. Closure Plan [22 CCR 66270.14(b)(13), 66264.112] {40 CFR 270.14(b)(13), 264.112}:

This section presents a closure plan for the RCRA-regulated facility owned and operated by The Dow Chemical Company (Dow). The subject facility is a manufacturing operation, located on 52 acres within an industrialized area of the City of Torrance in Los Angeles County, California.

In addition to the technical details of closure, this submittal provides closure cost estimates and a schedule under which closure efforts are to be conducted. This plan has been developed in accordance with California Code of Regulation (CCR), Title 22, Chapter 14. At this time, Dow anticipates closure of all hazardous waste management units (HWMUS) by converting them to <90-day generator storage units or to service where they will no longer manage hazardous wastes. A second option incorporated into this plan is closure of all HWMUs by removal of the units, or "clean closure."

1. Closure performance standard [22 CCR 66264.111] {40 CFR 264.111}:

This closure plan outlines the procedures and costs associated with the closure of a hazardous waste storage tank, a container storage area and two boilers. The HWMUs will be closed in a manner that:

- Minimizes the need for further maintenance;
- Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and
- Complies with the applicable closure requirements of 22 CCR Chapter 14.

2. Partial Closure and final closure activities 22 CCR 66264.112(b)] {40 CFR 264.112(b)}:

This closure plan contains the following information:

- A description of how each HWMU at the facility will be closed according to the closure performance standard;
- A description of how final closure of the facility will be conducted, including an estimate of the maximum extent of the operations which will not close during the active life of the facility;
- A description of steps necessary to remove all hazardous waste, decontaminate the HWMUs or render them non-hazardous at closure, and demonstrate successful closure by removal of all hazardous waste;

- A description of other activities necessary during closure to ensure that closure performance standards are satisfied;
 - An estimate of the expected year of final closure.
3. Maximum extent of operations [22 CCR 66264.112(b)(2)][40 CFR 264.112(b)(2)]:
- The maximum extent of operations that will be unclosed during the active life of the facility consists of the permitted tank and container storage areas, and the two waste fuel boilers. These operations are described in Section IV of this Part B; inventories associated with these operations are summarized below.
4. Maximum waste inventory [22 CCR 66264.112 (b)(3)][40 CFR 264.112 (b)(3)]:
- The following outlines the maximum inventory of hazardous wastes potentially on-site at a given point during the active life of the facility:
- Container storage area - 30,000 gallons (≈600 drums)
 - Tank storage area - 15,000 gallons
 - Boilers - Included in storage tank above.
5. Schedule for closure [22 CCR 66264.112(b)(6), 66264.113(a), 66264.113(b)] {40 CFR 264.112(b)(6), 264.113(a), 264.113(b)}:

Closure of the individual HWMUs will proceed concurrently or sequentially.

At this time, there is no anticipated date for closure of the Torrance facility and operations are expected to continue for the foreseeable future. However, it is possible that the HWMUs will be closed while the facility remains active. In order to satisfy regulatory requirements, the year 2032 has been selected as the date for closure of the HWMUs in a safe and secure manner as required by the Resource Conservation and Recovery Act (RCRA), and by the California Department of Toxic Substances Control (DTSC). Closure of the HWMUs alone, with the facility remaining active, is possible as early as 2006. Written notification of closure activities will be sent to DTSC at least 45 days prior to the date closure activities are expected to begin. Post-closure plans are not required, as no hazardous waste is disposed on this site.

Closure of each of the HWMUs will proceed independently of the remaining units. The total time required to close each HWMU at the facility (including the time required to treat or dispose of the entire hazardous waste inventory) is as follows:

a. Time allowed for closure:

All hazardous wastes will be removed from storage and shipped off-site for disposal within 90 days after receiving the final volume of hazardous wastes at each unit. Final closure will be completed within 180 days after receiving the final volume of hazardous wastes at each unit.

A milestone chart for completion of closure activities at each unit is provided below:

<u>Activity</u>	<u>Day</u>
Receipt of final waste volume.	0
Complete removal, treatment, or disposal of waste inventories.	90
Complete decontamination of equipment and structures.	110
Complete sampling and analysis, including soil beneath the various secondary containment pads.	140
Complete removal of equipment/structures, if necessary.	150
Complete removal of impacted soils, if necessary (will require an extension if extensive soil removal is necessary).	170
Complete closure certification.	180

b. Extension for closure time:

Dow may request an extension to the time allowed for closure, in accordance with the procedures at 22 CCR 66264.113(b) and other relevant requirements.

6. Inventory removal procedures [22 CCR 66264.112(b)(3)] {40 CFR 264.112, 264.114, 264.197(a)}:

The inventory of hazardous waste in the storage tank will be shipped off-site to a permitted facility. Solvent and water used to decontaminate the interior of the tank as well as material in the boiler supply lines will be handled in a similar manner. Closure of the tank and boilers may also generate hazardous waste residue. Any such material generated during the decontamination of the storage tank or boilers will be containerized and moved to the container storage area or shipped directly for off-site disposal. At this time all wastes generated during the closure process will be disposed of off-site and not in the boilers.

The inventory of containerized hazardous wastes will be shipped off-site to a permitted facility, at which time closure of the container storage area can begin. In the event that the facility is to remain operational following closure of the HWMUs, containerized hazardous wastes will be shipped off-site to a permitted facility within 90 days of their accumulation start date. In this case the container storage area would become a <90-day generator (non-permitted) container storage area.

Permitted off-site TSDFs that may receive Dow's wastes are currently located throughout California and the surrounding region. At the time of closure, Dow will select appropriate disposal facilities based on permit status, treatment technologies, price, potential future liabilities, and other factors. One facility that is currently capable of receiving Dow's wastes is Romic Environmental Technologies in East

Palo Alto, California. The distance to Romic's facility from Torrance is about 380 miles.

7. Disposal or decontamination of equipment, structures and soil:

All equipment will be properly decontaminated by steam cleaning or solvent rinsing. Rinsate will be collected by a vacuum truck or drummed prior to disposal. Rinsate water will be disposed of at a permitted facility or an approved wastewater treatment plant, if deemed acceptable based on characterization of the rinsate. Rinsate solvent and water will be disposed at a permitted offsite facility. Decontaminated equipment will be reused by Dow or sold for reuse or scrap to the maximum extent possible. Equipment expected to have value for reuse includes the tank, piping, pump motors, and instrumentation. Details of decontamination and disposal procedures for each HWMU are provided in Section XI.A.10.

8. Demolition and Removal [22 CCR 66264.112(b)(4)]:

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in permitted off-site facilities. Decontaminated structures may be returned to similar service, i.e. used for <90-day generator usage, or demolished down to the base pad. Decontaminated Debris will be removed and recycled or disposed of as clean construction debris. Details of decontamination and disposal procedures for each HWMU are provided in Section XI.A.10.

9. Underlying native soils will be sampled at each waste management unit to determine if waste constituents have migrated through containment systems. If waste constituents are detected, soils will be remediated, excavated and removed to a permitted off-site facility, or left in place if they pose no unacceptable risk to human health or the environment. Details of remediation, decontamination and disposal procedures for each HWMU are provided in Section XI.A.10.

10. Closure of disposal units/contingent closures [22 CCR 66270.14(b)(13), 66270.17(f), 66270.18(H), 66270.21(e), 66264.228(a)(2), 66264.228(c)(1)(i), 66264.258(b), 66264.258(c)(1)(ii), 66264.310(a), 66264.601] {40 CFR 270.14(b)(13), 270.17(f), 270.18(H), 270.21(e), 264.228(a)(2), 264.228(c)(1)(i), 264.258(b), 264.258(c)(1)(ii), 264.310(a), 264.601}:

The subject facility does not operate hazardous waste disposal units.

a. Impoundments

The subject facility does not manage hazardous waste in impoundments.

b. Cover design standards

The subject facility does not manage hazardous waste in impoundments.

c. (There is no checklist item XI.A.10.c on the DTSC Permit Completeness Checklist dated February 1992)

d. Cover Construction Standards

The subject facility does not manage hazardous waste in impoundments.

e. Closure of containers [22 CCR 66264.178] {40 CFR 264.178}:

Dow will conduct closure by removal of all hazardous waste and waste residues from the container storage area, or if the facility is to remain active, hazardous wastes in the container storage area can remain for up to 90 days from their accumulation start date. In the latter case, the container storage area will become a <90-day generator container storage area. As described in further detail in this section of the closure plan, Dow will follow a sequential program beginning with the removal off-site of all hazardous waste inventory. In the most likely case where the facility is to remain operational, the waste inventory will be minimized, but a small quantity of containers may remain in the container storage area from ongoing facility operations while closure activities take place. Following this activity, Dow will visually inspect the floor of the storage area and the pavement in the adjacent loading area for any evidence of past leakage. Any residues will be manually removed from the asphalt, or if that is infeasible, visibly-contaminated asphalt will be stripped off and containerized for off-site disposal at a permitted facility. The pavement will then be steam-cleaned to remove any remaining contaminants, and the rinsate will be collected and analyzed. Depending upon analytical results, the rinsewater will be shipped to a suitable wastewater treatment plant upon permission to do so from the operator, or shipped to an off-site permitted facility for treatment and disposal. Cores of the pavement and underlying native soil will be collected and analyzed for hazardous constituents handled at the facility, and the analyses compared to cores of "background" materials from areas where hazardous wastes or related process chemicals were not historically managed. Significant differences between the cores of containment areas and background areas, together with a risk-based assessment of those hazardous constituents, will determine the need for remediation, further decontamination, or removal prior to closure. Details of each step of the closure process are provided below.

The following plan describes the activities which will be implemented during the closure of the container storage area. This closure plan will be implemented as a partial facility closure where only the container storage area is affected, as closure of all HWMUs only, or as part of the Torrance facility final closure.

Closure of this unit will be accomplished by removal of all waste residue so as to attain "clean closure". Removal of all hazardous waste containers will depend, as stated above, on whether the facility is to remain active and the container storage area is to be converted to a <90-day generator container storage area. In order to ensure that all hazardous waste residues have been removed to the extent that no unacceptable risk to human health or the environment remains, samples of the pavement and underlying native soils will be collected and analyzed for constituents of concern present in hazardous wastes stored in the unit. These results will be compared to a background standard reflective of site

conditions unaffected by hazardous waste management activities, as described below.

This container storage area consists of approximately 6,900 square feet of asphalt paving (roadway type). The area is fenced on all sides and is equipped with a containment berm. A containment sump exists in the area (See Section IV for further details). Containerized wastes resulting from plastics and epoxy resin manufacturing activities are described in Sections I and III of this Part B. The maximum waste inventory in the drum storage area is 30,000 gallons, or about 600 drums.

Closure of the container storage area is designed to minimize the need for maintenance and to eliminate the post-closure escape of hazardous waste to the extent necessary to protect human health and the environment. This standard for closure will be achieved by disposal of all containerized wastes and waste residues at a permitted off-site facility. Containers, which are already labeled for shipping, will be properly manifested according to the contents of each container.

In the most likely case where the facility is to remain operational after closure of the container storage area, the waste inventory will be minimized, but a small quantity of containers may remain in the container storage area from ongoing facility operations while closure activities take place. Hazardous waste containers will be staged at the south side of the container storage area during closure activities at the north side and vice versa. All liquid wastes will be stored on secondary containment pallets during closure activities to prevent a spill from flowing into a cored area.

In the case that the container storage area is to be closed and no longer used for waste storage, the entire waste container inventory will be shipped to an off-site treatment facility prior to beginning closure activities.

After removal of waste inventory, the blacktop and container handling equipment (e.g., dollies) will be decontaminated. Decontamination will be according to the process listed below:

- All visible residues will be manually or mechanically scraped from the containment area and containerized for off-site disposal to a permitted facility.
- Containment area surfaces will be steam cleaned until visibly clean. If visible contamination remains the asphalt will be removed and containerized for off-site disposal.
- Rinsate will be collected in the containment sumps, directed to the sumps manually, or mopped up as necessary. From the sumps, the washwater can be pumped into containers or a vacuum truck for shipment to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment the rinsate will be analyzed for waste classification and disposal requirements.

Following initial decontamination, the pavement and underlying native soils will be sampled to determine whether additional decontamination is needed prior to clean closure. Sampling, analysis, and evaluation of data are described below:

- Pavement and underlying native soil will be sampled at 7 locations within the containment area, and 4 locations in the adjacent loading area. One of the sampling locations within the containment area will be beneath the surface drain, which is where any spilled material would accumulate. Sampling locations will be at the grid intervals shown in Attachment XI-1. However, authoritative sampling of visibly contaminated or deteriorated areas will be substituted for grid sampling, to the extent such areas are observed in a given grid. Any sampling points that are relocated for authoritative sampling will be documented in the final certification report.
- Pavement at each sample location will be cored using a portable drill and a coring bit. The diameter of the coring bit will be approximately 3 inches or larger, in order to ensure that core segments are of a sufficient size for testing (≈ 100 grams), and to allow for sampling of underlying soil. The coring bit may be cooled during the cutting process by rinsing or submerging it in distilled water. The coring bit will be air-dried as needed to prevent excess water from accumulating in the core hole. The coring bit will be advanced through the floor in two-inch increments. The core will be removed at the completion of each increment using hand tools. The coring bit and hand tools will be decontaminated after removal of each increment, using detergent and de-ionized water, and air-drying.

Pavement core samples will be sized to produce material that is capable of passing a 3/8-inch sieve. Size reduction will be performed by cutting, chopping, or crushing with a knife, saw, or hammer. The hand tools and the surface where the sample is prepared will be decontaminated between samples with detergent and de-ionized water, and then air-dried.

- Native soil beneath the asphalt floor will be sampled using a portable hand or power auger. The auger will be advanced in four 6-inch increments. The auger cuttings will be cleaned out of the borehole between increments using hand tools and a vacuum, to prevent soil in the upper interval from contaminating the lower interval. The sampling equipment will be decontaminated between each 6-inch increment using detergent, de-ionized water, and air-drying. Cuttings from the 12-18 inch and 18-24 inch intervals will be collected in clean sample containers.
- Each sample of pavement or soils will be placed in sample jars which are sealed and labeled. Soil samples for analysis for volatile organic compounds (VOCs) will be collected following EPA Method 5035 (Encore) to minimize vapor losses. Chain of custody procedures described in the Waste Analysis Plan (Section III.D of this Part B) will be followed. Samples will be analyzed by a laboratory that holds a current "California Department of Health Services Hazardous Waste Certification". Samples will be

extracted by EPA Method 1311, and analyzed for the following hazardous constituents which may be components of wastes stored in the area:

- volatile organic compounds by EPA Method 8260B;
 - antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, silver, thallium, and zinc by EPA Method 6010;
 - mercury by EPA Method 7470A or 7471A; and
 - chromium VI by EPA Method 7196.
- The cored pavement will be filled with a cement and bentonite mixture and the top portion will be coated with asphalt hot mix to match the surrounding surface.
 - Native soil will be sampled at the nearby unpaved recreational area located in the northwest quadrant of the Dow property and pavement will be sampled at the four corners of the top of the containment area by coring through the top of the containment berm using the methods described above. These soil and pavement samples will be analyzed for the parameters listed above, and will comprise the "background samples" that are used for determination of clean closure.

The results of background samples will be statistically evaluated to determine the upper 95% confidence interval (mean plus two standard deviations) for each parameter in each material. This upper confidence interval is the cleanup criteria for clean closure; that is, if pavement or subsoil contains TCLP, TTLC, or STLC concentrations that exceed this criteria, it must be evaluated for risk to human health and the environment and cleaned or removed as necessary prior to clean closure.

All equipment and structures which cannot be decontaminated shall be disposed of as hazardous waste in a permitted off-site facility. Decontaminated structures may be demolished down to the base pad or returned to service. Debris will be removed and recycled or disposed of as clean construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site facility.

Any solid hazardous wastes generated during decontamination procedures (e.g., personal protection equipment) will be containerized and shipped to a permitted off-site facility for disposal.

The area will be retained for storage of materials or converted to a <90-day generator container storage area following closure.

- f. Closure of tank [22 CCR 66264.197] {40 CFR 264.197}:

Dow will conduct tank closure by removal of all hazardous waste and waste residues from the tank storage areas. As described in further detail in this section of the closure plan, Dow will follow a sequential program beginning with the removal off-site of all hazardous waste inventory. The tank will be

decontaminated by completing a solvent triple rinsing. The solvent rinse will be followed by two successive steam cleanings to further ensure removal of hazardous waste constituents. Following this activity, Dow will visually inspect the containment area and the exterior of the tank for any evidence of past leakage. Any residues will be manually removed from the containment area, or if that is infeasible, residue will be removed by sandblasting and/or steam cleaning-power washing and containerized for off-site disposal at an approved Subtitle C facility. The containment areas will then be steam-cleaned to remove any remaining contaminants, and the rinsate will be containerized and analyzed. Depending upon analytical results, the rinsewater will be shipped to a suitable wastewater treatment plant upon permission to do so from the operator, or shipped to an off-site permitted facility for treatment and disposal. Cores of the concrete pavement and underlying native soil will be collected and analyzed for organic hazardous constituents of the waste fuel that is managed in the tank. Detection of organic hazardous constituents will require an evaluation of risk to human health and the environment and may constitute the need for further decontamination or removal prior to closure. Details of each step of the closure process are provided below.

The following plan describes the activities which will be implemented during the closure of the tank storage area. This closure plan will be implemented as a partial facility closure where only the tank storage area is affected, as closure of all HWMUs only, or as part of the Torrance facility final closure.

Closure of this unit will be accomplished by removal of all hazardous waste and, to the extent possible through triple rinsing and steam cleaning, waste residue so as to attain a "clean closure". In order to ensure that hazardous waste and waste residues have been removed to the extent necessary to protect human health and the environment, wipe samples of the internal tank surface, and core samples of the containment pad and underlying native soil will be collected and analyzed for constituents of concern present in hazardous wastes stored in the unit. Waste fuel constituents detected in wipe or core samples will require an evaluation of risk to human health and the environment and may necessitate additional decontamination or removal of the concrete or soil.

The tank, designated as T-307, is used to store recovered hydrocarbons, classified as hazardous waste due to the characteristics of ignitability and benzene toxicity, from the polystyrene process. The recovered hydrocarbons can be used as fuel for the two on-site boilers or shipped off-site for treatment and disposal. The specifications for the tank are as follows:

Tank	Capacity (gallons)	Length (feet)	Diameter (feet)	Material
T-307	15,000	22	10	Stainless Steel

Waste material is pumped from the generating process to the tank for storage; later the waste material is pumped to the fuel delivery systems of the two boilers or to a tank truck for off-site treatment and disposal.

Closure of the tank is designed to minimize the need for maintenance and eliminate the post-closure escape of hazardous waste to the extent necessary to protect human health and the environment. This standard will be achieved by off-site treatment and disposal of all tank wastes at permitted facilities. Off-site disposal costs are used in the closure cost estimate in Section XI.D. of this permit application. Hazardous waste in each tank will be pumped to tank trucks for transportation to the off-site permitted treatment facility.

Decontamination procedures will be carried out once the hazardous waste inventory has been removed. Decontamination will include cleaning of the interior and, if necessary, exterior of the tank and the concrete containment area.

The tank will be triple rinsed with a suitable solvent (e.g., fuel oil or ethylbenzene) followed by two successive steam cleanings to ensure maximum removal of hazardous constituents. The rinsate will be sent off-site for treatment at a permitted facility. Rinsing of the tank interiors will be performed manually using a high-pressure spray. Piping to and from the tank will also be flushed with the solvent and sent off-site for treatment at a permitted facility.

Decontamination of tank interior will be as follows:

- Lines and piping leading to the tank will be drained and flushed into the tank with a suitable solvent, and this material will be removed and sent off-site for treatment and disposal.
- Interior surfaces will be triple rinsed with a suitable solvent and the rinsate will be removed and sent off-site for treatment. The solvent rinse will be followed by two successive steam cleanings to further ensure removal of hazardous waste constituents.
- After triple rinsing and steam cleaning, the tank will be visually inspected from the exterior (no vessel entry) to determine if any polymer is present that will require physical removal. Any solid residues on the interior of the tank will be physically removed to the extent practical by scraping or suction and containerized for off-site disposal;

At the conclusion of these activities, wipe tests will be performed to determine the need for further decontamination if the tank is to be removed from hazardous waste service or recycled or disposed of. If the tank is to be returned to hazardous waste service as a <90-day generator tank, decontamination will be complete after triple rinsing, steam cleaning, and removal of all liquid waste.

Wipe tests will be performed at two locations in each tank, as shown by the figure in Attachment XI-2. Each location consists of a 100 square centimeter area around the interior of the tank shell. Wipe tests will be performed using cotton swabs moistened in distilled water. The swab will be held in a metal clamp and wiped twice in perpendicular directions across the sampling locations using moderate pressure.

The swab will be sealed in a glass jar with Teflon-lined cap, and labeled with the tank number and sample location. Chain of Custody procedures described in Section III.D of this Part B will be followed. Samples will be analyzed by a laboratory that holds a current "California Department of Health Services Hazardous Waste Certification". Samples will be analyzed for volatile organic compounds by EPA Method 8260B.

The criteria for successful decontamination of the tank is less than 500 µg/kg (ppb) of styrene on the swab. Styrene was selected as the compound of concern because it has a high concentration in the waste fuel (see Section III) and it is not likely to be present in the decontamination solvent. Other principal organic compounds that are expected to be present in the waste fuel, especially ethylbenzene and benzene, are also expected to be present in fuel oil, ethylbenzene, or other likely decontamination solvents. Therefore, such other compounds are not good candidates for demonstrating that the waste fuel has been removed from the tank, as their presence would only indicate residual solvent from the final internal rinse. If styrene is detected in the wipe sample above the decontamination standard, the decontamination procedure will be repeated, or the tank will be removed for offsite disposal at a permitted facility.

Decontamination of the containment area will be as follows:

- All visible residues in the containment area and tank exterior will be manually or mechanically removed and containerized for off-site disposal to a permitted facility.
- Containment area surfaces will be steam cleaned until visibly clean. If visible contamination remains the concrete surface will be removed and containerized for off-site disposal.
- Rinsate will be collected in the containment sump, directed to the sump manually, or mopped up as necessary. From the sump, the wash water can be pumped into containers or a vacuum truck for shipment to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment the rinsate will be analyzed for waste classification and disposal requirements.

Following initial decontamination, the concrete pavement and underlying native soils will be sampled to determine whether additional decontamination is needed prior to clean closure. Sampling, analysis, and evaluation of data are described below:

- Pavement and underlying soil will be sampled at 4 locations within the Tank 307 containment area, including at the base of the sump in the northwest corner, which is where any significant amount of spilled material would accumulate. Sampling locations will be at the locations shown in Attachment XI-3. However, authoritative sampling of visibly contaminated or deteriorated sections of pavement will be added or substituted for designated sampling locations; to the extent such areas are observed in the

containment area. Any sampling points that are relocated for authoritative sampling will be documented in the final certification report.

- Pavement at each sample location will be cored using a portable drill and a coring bit. The diameter of the coring bit will be approximately 3 inches or larger, in order to ensure that core segments are of a sufficient size for testing (≈ 100 grams), and to allow for sampling of underlying soil. The coring bit may be cooled during the cutting process by rinsing or submerging it in distilled water. The coring bit will be air-dried as needed to prevent excess water from accumulating in the core hole. The coring bit will be advanced through the floor in two-inch increments. The core will be removed at the completion of each increment using hand tools. The coring bit and hand tools will be decontaminated after removal of each increment, using detergent and de-ionized water, and then air-dried.

Pavement core samples will be sized to produce material that is capable of passing a 3/8-inch sieve. Size reduction will be performed by cutting, chopping, or crushing with a knife, saw, or hammer. The hand tools and the surface where the sample is prepared will be decontaminated between samples with detergent and de-ionized water, and then air-dried.

- Native soil beneath the pavement and associated sub-base or imported fill will be sampled using a portable hand or power auger. The auger will be advanced in four 6-inch increments. The auger cuttings will be cleaned out of the borehole between increments using hand tools and a vacuum, to prevent soil in the upper interval from contaminating the lower interval. The sampling equipment will be decontaminated between each 6-inch increment using detergent, de-ionized water, and air-drying. Cuttings from the 12-18 inch and 18-24 inch intervals will be collected in clean sample containers.
- Each sample of pavement or soils will be placed in sample jars which are sealed and labeled. Soil samples for analysis for volatile organic compounds (VOCs) will be collected following EPA Method 5035 (Encore) to minimize vapor losses. Chain of custody procedures described in Section III.D of this Part B will be followed. Samples will be analyzed by a laboratory that holds a current "California Department of Health Services Hazardous Waste Certification". Samples will be extracted by EPA Method 1311, and analyzed for volatile organic hazardous constituents by EPA Method 8260B. The criteria for successful decontamination is nondetectable levels of hazardous constituents or an evaluation of no unacceptable risk to human health or the environment.
- The cored pavement will be backfilled with a cement and bentonite mixture and the surface recoated with an impervious coating to prevent spilled materials from impacting the concrete and soil below.

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in a permitted off-site facility. Decontaminated structures may be returned to similar service or demolished down to the base pad. Debris will be removed and disposed of as clean

construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site facility.

Any solid hazardous wastes generated during decontamination procedures (i.e., personal protection equipment) will be containerized and transported to a permitted off-site facility.

g. Closure of waste piles [22 CCR 66264.258] {40 CFR 264.258}:

The subject facility does not manage hazardous waste in piles.

h. Closure of surface impoundments [22 CCR 66264.228] {40 CFR 264.228}:

The subject facility does not manage hazardous waste in surface impoundments.

i. Closure of incinerators [22 CCR 66264.351] {40 CFR 264.351}:

Dow will conduct closure by removal of all hazardous waste and waste residues from the boiler area. As described in further detail in this section of the closure plan, Dow will follow a sequential program beginning with the removal of the waste fuel inventory. Waste fuel lines will then be flushed with a suitable solvent (e.g., fuel oil or ethylbenzene), and the boiler operated on virgin fuels to decontaminate the interior surfaces. Following this activity, Dow will visually inspect the containment area as well as the exterior of the boilers for any evidence of past leakage. Any residues will be removed manually or by sandblasting and containerized for off-site disposal at a permitted facility. The containment area will then be steam-cleaned to remove any remaining contaminants. The rinsate will be containerized and analyzed. Depending upon analytical results, the rinsewater will be shipped to a suitable wastewater treatment plant upon permission to do so from the operator, or shipped to a permitted off-site facility for treatment and disposal. Cores of the concrete pavement and underlying native soil will be collected and analyzed for organic hazardous constituents of the waste fuel that is managed in the tank. Detection of organic hazardous constituents will require an evaluation of risk to human health and the environment and may constitute the need for remediation or further decontamination or removal prior to closure. Details of each step of the closure process are provided below.

The following plan describes the activities which will be implemented during the closure of the boiler area. This closure plan will be implemented as a partial facility closure where only the boiler area is affected, as closure of all HWMUs only, or as part of the Torrance facility final closure.

Closure of this unit will be accomplished by removal of all hazardous waste and waste residue so as to attain a "clean closure". In order to ensure that all hazardous waste and waste residues have been removed, samples of the pavement and underlying native soils will be collected and analyzed for constituents of concern present in hazardous wastes stored in the unit. Waste

fuel constituents detected in core samples will require an evaluation of risk to human health and the environment and may necessitate remediation, additional decontamination, or removal of the containment pad or underlying soils.

Two boiler units capable of burning hazardous waste are operated at the Torrance facility. They can burn a mixture of hazardous waste and fossil fuel, or they can operate solely on fossil fuel. The fossil fuel and waste mixture is metered to the boiler by independent, calibrated, orifice plate flow meters. The boilers burned both a mixture of hazardous waste and fossil fuel and at times only fossil fuel until 1992. Since that time, they have burned fossil fuel (natural gas) exclusively.

The following bulleted items outline the closure procedures which will be followed during the boiler decontamination activities.

- The existing waste fuel inventory will be shipped off-site for treatment at a permitted facility .
- Waste fuel lines leading into the boilers will be flushed with solvent and this flush will be sent off-site for treatment at a permitted facility.
- If necessary, the boiler will be fired with virgin fuel for 24 hours at approximately 65 percent maximum feed rate. As of the date of this closure plan, the boilers had been fired exclusively on natural gas since 1992. This step will not be necessary if this is still the case as expected when closure begins.
- The boiler will be shut down and allowed to cool to facilitate decontamination efforts.
- Any visible residue will be removed from the outside of the boiler or the concrete containment area, and containerized for offsite disposal to a permitted facility.
- The exterior of the boiler will be steam cleaned, as well as the concrete containment area. Temporary containment berms or booms will be set up as needed to contain rinsate. The containment area serving the boilers consists of the western half of the surrounding concrete pad, and measures approximately 76 feet x 38 feet.
- Rinsate will be collected in the containment sumps, directed to the sumps manually, or mopped up as necessary. From the sumps, the washwater can be pumped into containers or a vacuum truck for shipment to an approved wastewater treatment plant or permitted off-site facility. Prior to shipment the rinsate will be analyzed for waste classification and disposal requirements.

At the conclusion of these activities, wipe tests of the boiler and samples of the containment pad will be collected to determine the need for further decontamination, as described below:

- Wipe tests will be performed on two accessible interior portions of the combustion chamber near where liquid wastes were introduced from the bottom of the boiler. Each wipe sampling location will consist of a 100 square centimeter area. Wipe tests will be performed using cotton swabs moistened in distilled water. The swab will be held in a metal clamp and wiped twice in perpendicular directions across the sampling locations using moderate pressure.
- The swab will be sealed in a glass jar with Teflon-lined cap, and labeled with the tank number and sample location. Chain of Custody procedures described in Section III.D of this Part B will be followed. Samples will be analyzed by a laboratory that holds a current "California Department of Health Services Hazardous Waste Certification". Samples will be analyzed for volatile organic compounds by EPA Method 8260B.
- The criteria for successful decontamination of the boiler is less than 500 µg/kg of individual organic hazardous constituents common to the process on the swab. If process related organic constituents are detected in the wipe sample at concentrations greater than the cleanup criteria, decontamination of the impacted portions of the boiler interior will be accomplished by steam cleaning, or the impacted portions of the boiler will be removed for offsite disposal at a permitted facility.
- Pavement and underlying native soil will be sampled at 9 locations within the containment area. Sampling locations will be at grid intervals of 25 feet as shown in Attachment XI-4. However, authoritative sampling of visibly contaminated or deteriorated sections of pavement will be substituted for grid sampling; to the extent such areas are observed in a given grid. Any sampling points that are relocated for authoritative sampling will be documented in the final certification report.
- Pavement at each sample location will be cored using a portable drill and a coring bit. The diameter of the coring bit will be approximately 3 inches or larger, in order to ensure that core segments are of a sufficient size for testing (≈100 grams), and to allow for sampling of underlying soil. The coring bit may be cooled during the cutting process by rinsing or submerging it in distilled water. The coring bit will be air-dried as needed to prevent excess water from accumulating in the core hole. The coring bit will be advanced through the floor in two-inch increments. The core will be removed at the completion of each increment using hand tools. The coring bit and hand tools will be decontaminated after removal of each increment, using detergent and de-ionized water, and then air-dried.

Pavement core samples will be sized to produce material that is capable of passing a 3/8-inch sieve. Size reduction will be performed by cutting, chopping, or crushing with a knife, saw, or hammer. The hand tools and the surface where the sample is prepared will be decontaminated between samples with detergent and de-ionized water, and then air-dried.

- Native soil beneath the pavement and associated sub-base or imported fill will be sampled using a portable hand or power auger. The auger will be advanced in four 6-inch increments. The auger cuttings will be cleaned out of the borehole between increments using hand tools and a vacuum, to prevent soil in the upper interval from contaminating the lower interval. The sampling equipment will be decontaminated between each 6-inch interval using detergent, de-ionized water, and air-drying. Cuttings from the 12-18 inch and 18-24 inch intervals will be collected in clean sample containers.
- Each sample of pavement or soils will be placed in sample jars which are sealed and labeled. Soil samples for analysis for volatile organic compounds (VOCs) will be collected following EPA Method 5035 (Encore) to minimize vapor losses. Chain of custody procedures described in Section III.D of this Part B will be followed. Samples will be analyzed by a laboratory that holds a current "California Department of Health Services Hazardous Waste Certification". Samples will be extracted by EPA Method 1311, and analyzed for volatile organic hazardous constituents by EPA Method 8260B. The criteria for successful decontamination is nondetectable levels of hazardous constituents or an evaluation of no unacceptable risk to human health or the environment.
- The cored pavement will be backfilled with a cement and bentonite mixture and the surface recoated with an impervious coating to prevent spilled materials from impacting the concrete and soil below.

All equipment and structures which cannot be successfully decontaminated shall be disposed of as hazardous waste in permitted offsite facilities. Decontaminated structures may be returned to service or demolished down to the base pad. Decontaminated Debris will be removed and disposed of as clean construction debris. Impacted soils which pose an unacceptable risk to human health or the environment will be remediated or excavated and removed to a permitted off-site TSDF.

Any solid hazardous wastes generated during decontamination procedures (i.e., personal protection equipment) will be containerized and transported to a permitted off-site facility.

- j. Closure of landfills [22 CCR 66264.310] {40 CFR 264.310}:

The subject facility does not manage hazardous waste in landfills.

- k. Closure of land treatment facilities [22 CCR 66264.280] {40 CFR 264.280}:

The subject facility does not manage hazardous waste in land treatment facilities.

- l. Closure of drip pads

The subject facility does not manage hazardous waste in drip pads.

m. Closure of miscellaneous units [22 CCR 66264.601] {40 CFR 264.601}:

The subject facility does not manage hazardous wastes in miscellaneous units.

11. Closure Certification [22 CCR 66264.115] {40 CFR 264.115}

Closure will be certified and documented by an independent registered professional engineer. The certification will attest that the relevant HWMU has been closed in accordance with the specifications in the approved Closure Plan. The certification will include the following:

a. Activities to be Conducted

The engineer certifying closure will observe typical procedures during closure to ensure that they meet the requirements of the approved closure plan. These include inventory removal, equipment decontamination, verification sampling, and removal of contaminated materials.

b. Testing and analyses to be performed

The engineer certifying closure will observe typical sampling conducted to verify clean closure, including chain of custody procedures. The engineer will review analytical data from the laboratory, including the results of quality control samples and calibrations, to determine if decontamination is successful.

c. Criteria for Evaluating Adequacy

The engineer will certify that closure is complete if all relevant procedures described in the approved Closure Plan have been followed. The engineer will document any deviations from the approved procedures, recommendations to correct deviations, and the results of corrective action.

d. Schedule of Inspections

The engineer certifying closure will conduct inspections as needed to perform the activities identified in Section XI.A.11.a. These inspections will be scheduled as the closure proceeds, according to the progress achieved on the various closure tasks. The inspections will generally be unannounced, except when coordination is needed to observe an "instantaneous" activity (e.g., sampling).

e. Types of Documentation

The engineer certifying closure will document observations in field notes, as needed to ascertain that the approved Closure Plan has been implemented. These notes, and a brief narrative describing the observations, will be included in the certification report. The narrative will describe, as a minimum, the following:

- 1) Activities conducted during closure.
- 2) Testing and analysis performed.
- 3) Criteria for evaluation adequacy.
- 4) Schedule of inspections.
- 5) Types of documentation.
- 6) Certification signed by Dow and certifying engineer.

The report will also include the analytical data report from the laboratory.

f. Submit Certification

The certification report, signed by Dow and by the certifying engineer, will be submitted to DTSC within 60 days of the completion of closure.

- B. Post-closure Plan/Contingent Post-closure Plan [22 CCR 66270.14(b)(13), 66270.17(f), 66270.18(h), 66270.20(f), 66270.21(e), 66270.23(a)(3), 66264.118, 66264.197(b), 66264.197 (c)(2), 66264.228(b), 66264.228(c)(1)(ii), 66264.258(b), 66264.258(c)(1)(ii)] {40 CFR 270.14(b)(13), 270.17(f), 270.18(h), 270.20(f), 270.21(e), 270.23(a)(3), 264.118, 264.197(b), 264.197 (c)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii)}:

The Torrance facility will be clean closed by removing hazardous waste and contaminated equipment, structures and soils to the extent that an unacceptable risk to human health or the environment is determined to remain at the facility from hazardous waste constituents in each of the areas described in this closure plan. Following this closure, no hazardous waste will be treated, stored or disposed of at the facility. Therefore, RCRA post-closure requirements/cost estimates will not be applicable to this facility.

C. Notices Required for Disposal Facilities:

The subject facility does not operate hazardous waste disposal units.

- D. Closure Cost Estimate [22 CCR 66264.142, 66270.14(b)(15)] {40 CFR 264.142, 270.14(b)(15)}:

The closure cost estimates outlined in Tables IX-1, IX-2, and IX-3 equal the cost of final closure of individual units at the point in plant operations when the extent and manner of the facility's operations would make closure the most expensive. Closure costs have been developed for all regulated units, and are summarized in Table IX-4. The estimates are based upon hiring a third party (who is neither a parent nor a subsidiary of the owner or operator) to close the facility.

No salvage values from the sale of hazardous or non-hazardous wastes, facility structures or equipment, land or other assets associated with the facility at the time of partial or final closure are included. No zero costs for hazardous wastes have been incorporated.

The closure costs will be adjusted for inflation annually as required by 22 CCR 66264.142 and 40 CFR 264.142 to account for inflation by using an inflation factor

derived from the annual Implicit Price Deflector for Gross National Product, published by the U.S. Department of Commerce.

- E. Post-closure Cost Estimate [22 CCR 66264.144, 66270.14(b)(16)] {40 CFR 264.144, 270.14(b)(16)}:

The Torrance Facility will be clean closed by removing all hazardous waste and contaminated equipment, structures and soils to the extent that an unacceptable risk to human health or the environment is determined to remain at the facility from hazardous waste constituents in each of the areas described in this closure plan. Following this closure, no hazardous waste will be treated, stored or disposed of at the facility. Therefore, RCRA post-closure requirements/cost estimates will not be applicable to this facility.

- F. Closure Plan Amendments [22 CCR 66264.112]:

A written request for a permit modification will be submitted by registered mail with a copy of any amended closure plan for review by the Department. This request may be made at any time prior to partial or final closure; but will be made within 60 days whenever any changes are made in operating plans or facility design which affect the closure plan or there is a change in the expected year of closure; or within 30 days after any unexpected events which require a modification to the approved closure plan occur during a partial or final closure.

- G. DTSC Notification Before Closure [22 CCR 66264.112(d)(2)]:

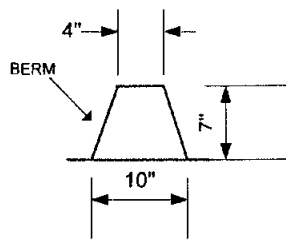
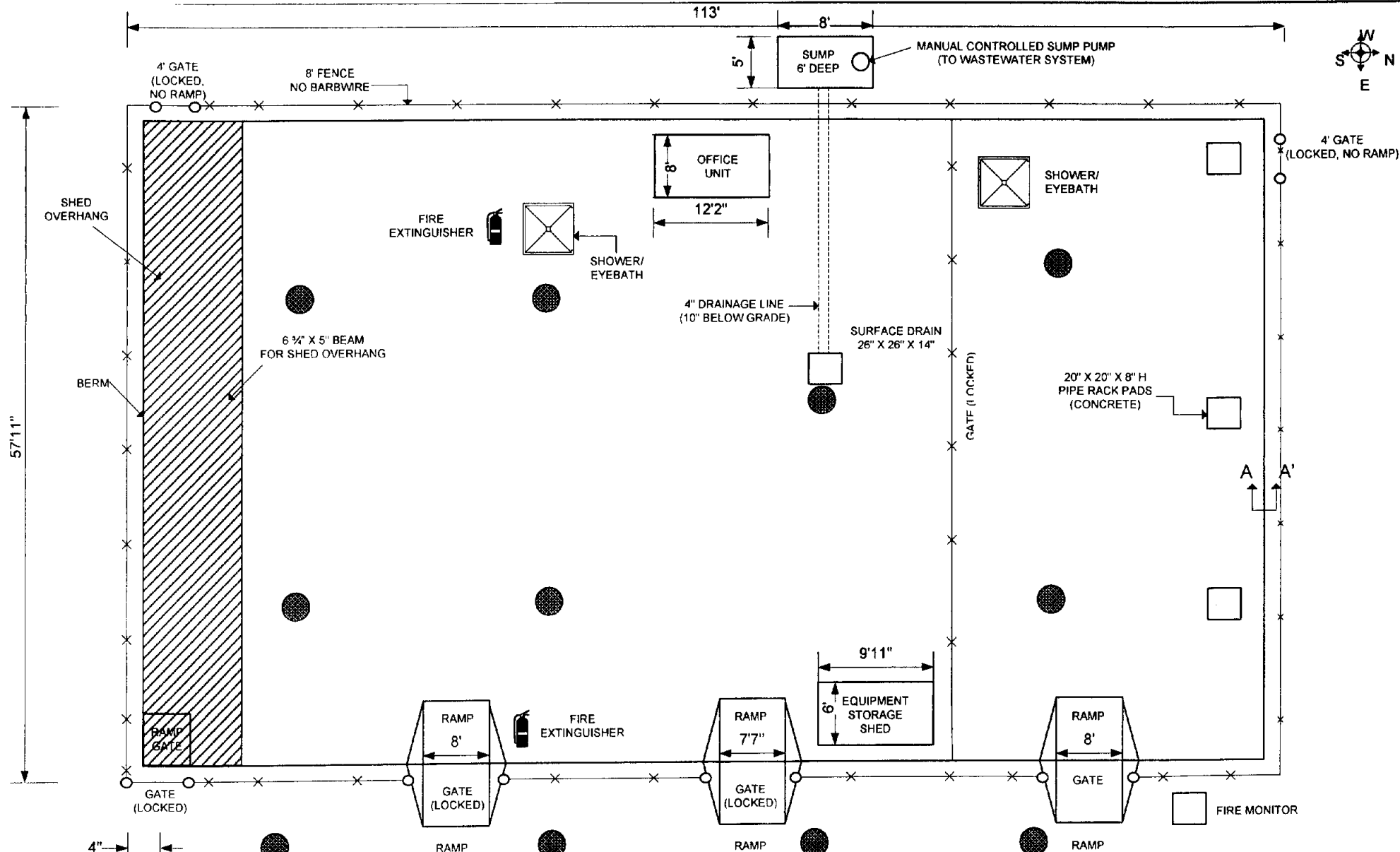
The Department will be notified, in writing, at least 45 days prior to the date on which final closure of the facility is expected to begin. The date closure is expected to begin will be no later than the date on which any hazardous waste management unit receives the known final volume of hazardous wastes or, if there is a reasonable possibility that the HWMU will receive additional hazardous wastes, no later than one year after the date on which the unit received the most recent volume of hazardous waste.

- H. Recordkeeping

The approved closure plan with approved revisions, and the latest closure cost estimate will be kept at the facility until final closure is completed and certified.

ATTACHMENT XI-1

**CLOSURE SAMPLE LOCATIONS
FOR CONTAINER STORAGE**



NOTE:
1. NOT TO SCALE

LEGEND:
● SAMPLING LOCATION

URS

The Dow Chemical Company
Torrance Facility
Container Storage Area Sampling Plan

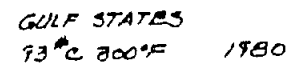
PREPARED BY: RPM
CHECKED BY: GMS
DATE: 10/26/2005

P.E. DWG. NO 05-002
REVISION NO: _____

ATTACHMENT XI-2

**CLOSURE WIPE SAMPLE LOCATIONS
FOR STORAGE TANKS**

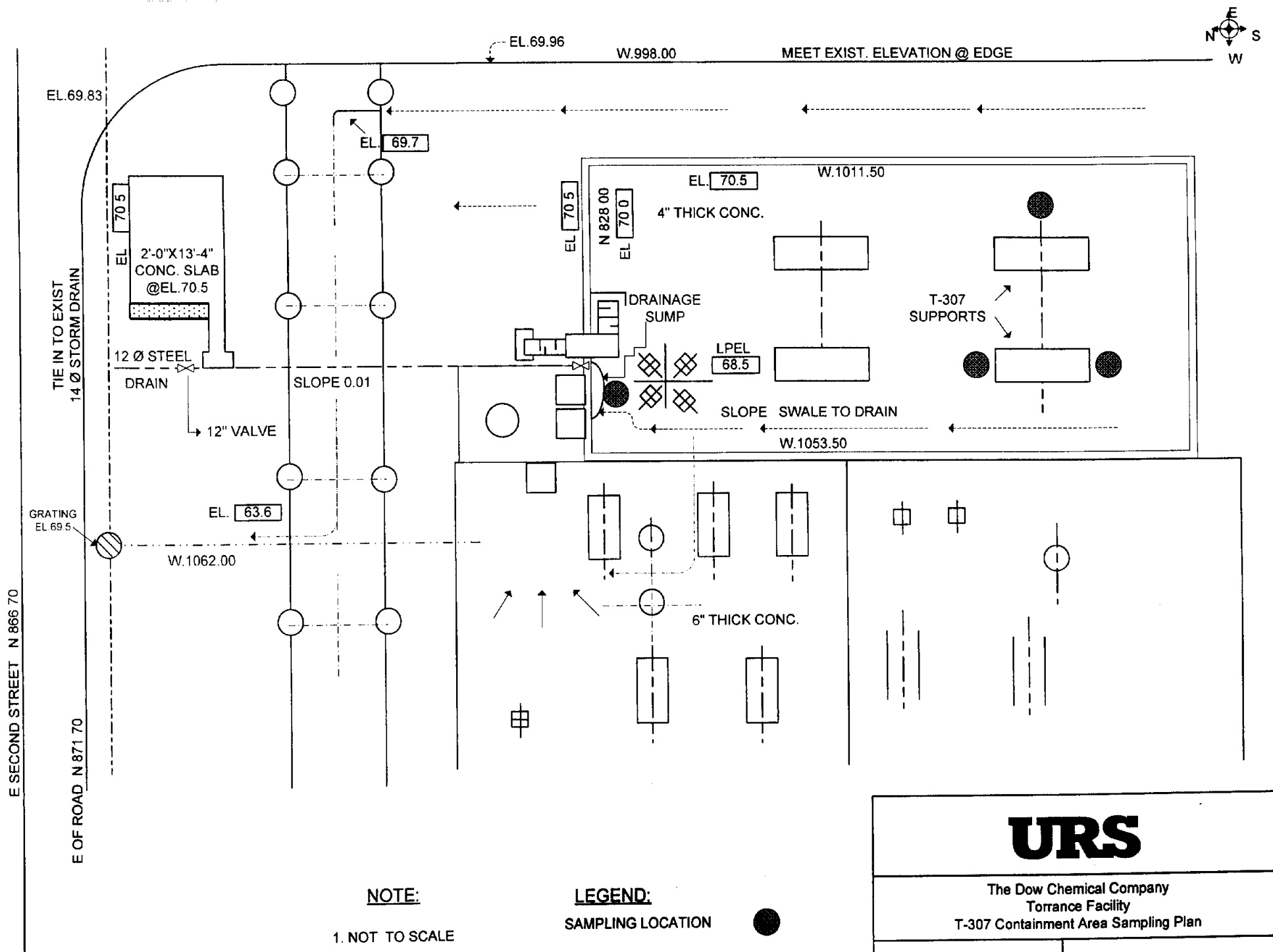
DOM C. BEATTIE, P.E.
SAMPLING LOCATIONS FOR CIRCUMFERENCE WIPE TESTS



INSPECTED BY		DR. H. DOB		T-357 SLUDG DRUM	
NO.	DATE	BY	DATE	DND CHBY-29L	
1	9/24/72	DOB	CHK.	703 BRANCA, CA.	
			APP'D.	DWG. NO.	
			DATE	VC 2353	

ATTACHMENT XI-3

**CLOSURE SAMPLE LOCATIONS
FOR STORAGE TANKS**



URS

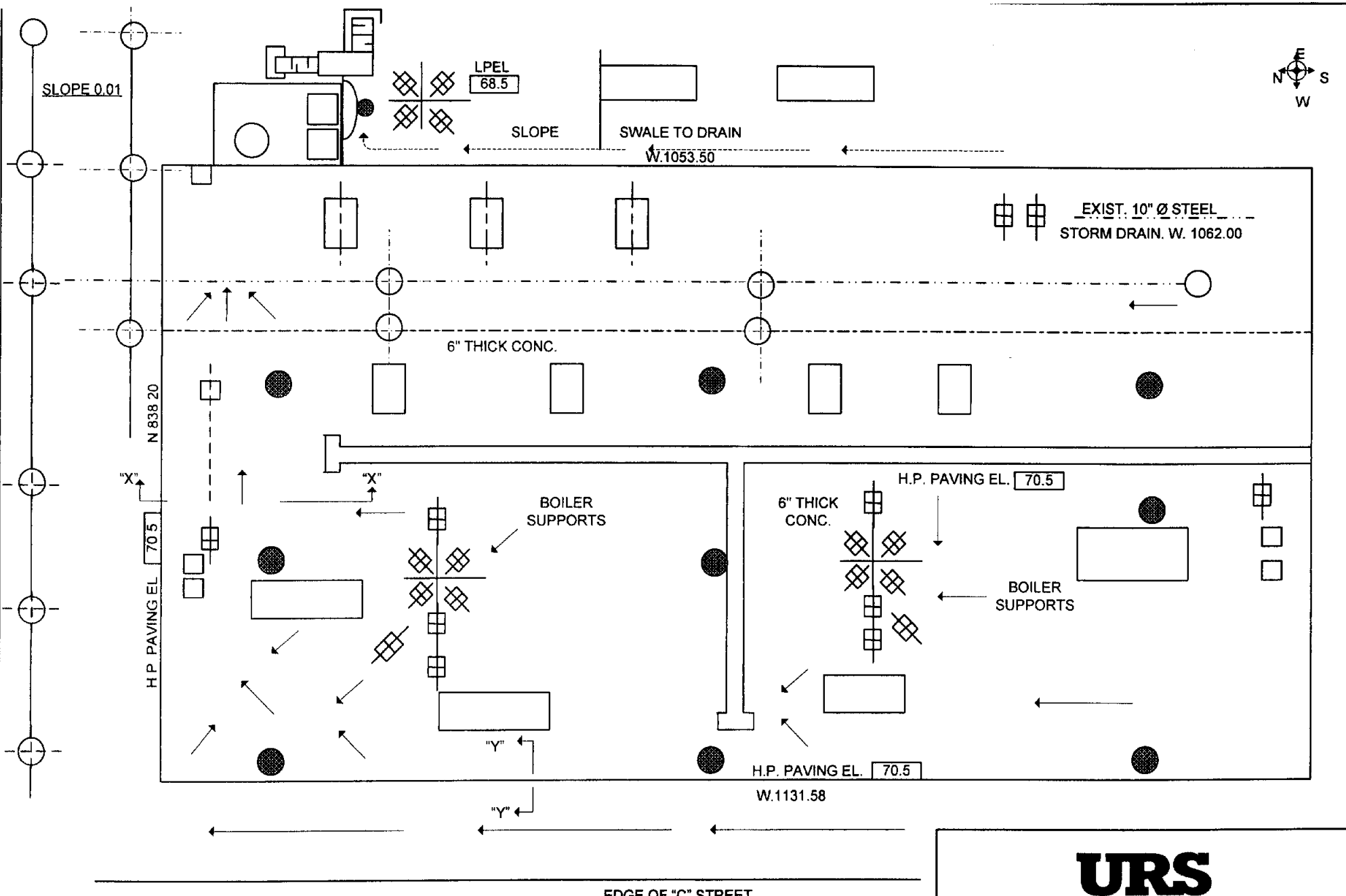
The Dow Chemical Company
Torrance Facility
T-307 Containment Area Sampling Plan

PREPARED BY: RPM
CHECKED BY: GMS
DATE: 10/27/2005

P.E. DWG. NO 05-003
REVISION NO: _____

ATTACHMENT XI-4

**CLOSURE SAMPLE LOCATIONS
FOR BOILERS**



NOTE:
1. NOT TO SCALE

LEGEND:
● SAMPLING LOCATION

URS

The Dow Chemical Company
Torrance Facility
Boiler Area Sampling Plan

PREPARED BY: RPM
CHECKED BY: GMS
DATE: 10/27/2005

P.E. DWG. NO 05-004
REVISION NO: _____



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control

Maureen F. Gorsen, Director
1011 North Grandview Avenue
Glendale, California 91201



Arnold Schwarzenegger
Governor

July 17, 2006

Mr. Jose Esquivel
The Dow Chemical Company
305 Crenshaw Blvd.
Torrance, California 90503

NOTICE OF DEFICIENCY FOR THE REVIEW OF THE CLOSURE PLAN, THE DOW
CHEMICAL COMPANY, 305 CRENSHAW BOULEVARD, TORRANCE, CALIFORNIA,
EPA NUMBER CAD 009 547 050

Dear Mr. Esquivel:

The Department of Toxic Substances Control (DTSC) has reviewed the Modified Closure Plan for the closure of the hazardous waste management units at the Dow Chemical Company. Based on the review of the Modified Closure Plan, DTSC found deficiencies to the Modified Closure Plan for the hazardous waste management units. Attached is the Notice of Deficiency (NOD) for the review of your closure plan. Please correct the noticed items and resubmit the closure plan by August 17, 2006.

If you have any further questions or would like to schedule a meeting to discuss the comments in the NOD, please contact Vu Nguyen, DTSC project manager, at (818) 551-2199.

Sincerely,

Yolanda Garza
Unit Chief
Southern California Permitting and
Corrective Action Branch

Enclosure

cc: Mr. Gregg Stiglic (w/ enclosures)
URS Corporation
300 North Sepulveda Boulevard, Suite 100
El Segundo, California 90245

Dow Chemical
July 17, 2006
Page 2

cc: Ms. Sandy Galganski (w/o enclosures)
Dow Chemical Company
901 Loveridge Road
Pittsburg, California 904565

NOTICE OF DEFICIENCY FOR THE MODIFIED CLOSURE PLAN FOR DOW CHEMICAL

GENERAL COMMENTS:

- It is recommended that the closure plan follows the format present in the Permit Writer Instructions for Closure of Storage and Treatment Facilities.
- The closure plan should be submitted as a stand alone document.

SPECIFIC COMMENTS:

I. Facility Identification, Location, and Design

- Please include facility's name, address, and other pertinent information about who owns and or operates the facility.
- Describe the design and configurations of each hazardous waste management unit at the facility and identify the types and quantities of hazardous wastes handled. This may include pumps and transfer piping.
- Describe the general physical characteristics of the site and its immediate surroundings.
- Describe the nature of business.
- Please include springs and surface water bodies in the area, plus all drinking water wells within ¼ mile of the facility.
- Describe the hydrogeologic conditions and the lithology at the site. The information presented in this section should include details of hydrogeology in the immediate and adjacent areas to the facility. Also, the soil class, soil depth, permeability, depth to groundwater, identification of aquifers, groundwater flow rate and direction, and a description of groundwater monitoring systems at the facility or in the immediate vicinity.
- Please describe the weather in general and discussion of weather patterns and climatic changes in the area during the year; description, frequency and amounts of precipitation which occur at the site and immediate vicinity during the year; discussion of the prevailing winds, speed, etc., in the region.

II. Description of Hazardous Waste Constituents

Please provide a summary of the hazardous constituents that may have been released or have the potential to be released to the hazardous waste management units. Please review the manifest records to help identify the hazardous waste managed at the site.

III. Estimate and Management of Maximum Inventory

Please include the amount of hazardous waste and residues generated by sampling activities and facility decontamination (e.g., soil from sample boring, rinse-water, solvent rinse, sandblasting grit, personal protective garments and equipment).

If the waste inventory will be shipped offsite to hazardous waste treatment, storage or disposal facilities, the owner/operator must address the following in the closure plan:

- Procedures and criteria to determine if the waste is hazardous according to applicable federal and state regulations.
- An estimate of the quantity of hazardous waste to be sent offsite.
- A description of treatment or disposal methods at the final hazardous waste management facility to support the closure cost estimate.
- An estimate of the distance to the final waste management facility;

- Procedures the owner/operator will use to determine if the final hazardous waste management facility is permitted to accept the wastes generated from the closure activities
- Procedures the owner/operator will use to demonstrate compliance with all applicable federal and state regulations for hazardous waste generators and transporters (if applicable), including maintaining copies of all manifests and shipping papers as part of the closure documentation package.
- Note – The owner or operator who closes a hazardous waste facility and ships contaminated wastes and materials offsite for disposal is responsible for determining whether the wastes are subject to land disposal restrictions.

IV. Decontamination Procedures for Equipment, Structures, and Buildings

The closure plan must identify all areas requiring decontamination. Provide detailed procedures for cleaning, removing, or disposing of contaminated equipment, structures, and buildings. Please include associated pumps and piping (along with dimensions).

Page XI-15, third bullet – Although the boilers had been fired on natural gas since 1992, it is still permitted to burn hazardous waste stream. The Department has no record of the period since 1992 on natural gas firing. To ensure compliance with the closure regulations, the boilers need to be fired with virgin fuel for 24 hours at approximately 65 percent maximum feed rate.

V. Confirmation Sampling Plan for Containment Structures, Tanks, and Equipment

The submitted closure plan contains some of the elements listed below but not all. The confirmation sampling plan must include a discussion of the following elements:

- 1) Sampling objectives/purpose (need to be discussed)
- 2) Number and locations of samples to be taken
- 3) Type of samples
- 4) Field sampling method (need to be discussed)
- 5) Quality control samples (need to be discussed)
- 6) Decontamination of sampling equipment
- 7) Chain-of-custody procedures (need to be discussed)
- 8) Packaging/preservation and transportation (need to be discussed)
- 9) Documentation (need to be discussed)
- 10) Analytical test methods (need to be discussed)

Details of items 2, 3, 4, and 10 may be presented in a matrix form for each set of samples taken from the tank and equipment, the boilers and equipment, the container storage area and equipment, and the secondary containment.

VI. Soil Sampling Plan

The submitted closure plan contains some of the elements listed below but not all. The soil sampling plan should discuss the following elements:

- 1) General description of confirmation soil sampling (need to be discussed)
- 2) Sampling locations and depths
- 3) Types of soil samples
- 4) Sample collection methods (need to be discussed)
- 5) Quality control samples (need to be discussed)
- 6) Chain-of-custody (need to be discussed)

- 7) Packaging/preservation and transportation (need to be discussed)
- 8) Documentation (need to be discussed)
- 9) Analytical test methods

Details of items 2, 3, 4, and 9 may be presented in a matrix form for each set of samples taken from the tank and equipment, the boilers and equipment, the container storage area and equipment, and the secondary containment.

VII. Analytical Test Methods

Describe all analytical methods to be used for all hazardous constituents of concern. This section must include a statement that all analyses will be performed by a certified laboratory. This section should be revised to include the test parameters and constituents that will be tested.

The hazardous waste constituents of concern can be analyzed by one or more of the SW-846 methods. For each method, SW-846 specifies the Method of Detection Limits (MDLs) and the Practical Quantitation Limits (PQLs). For a "clean closure" removal standard, the method with a lowest MDL (and hence the lowest PQL) should be selected as the appropriate method for testing.

VIII. Closure Performance Standards (Cleanup Levels)

The goal of a closure plan is to achieve clean closure of RCRA and/or State only hazardous waste regulated units, where all hazardous waste and hazardous constituent residues are removed or are left in place at levels that are protective of public health and the environment. The facility can achieve clean closure by means of soil removal of contaminated areas and/or through a health based risk assessment. This section should specify which performance standard(s) to be used and should list clean-up values of the hazardous waste constituents that can be achieved so that it is protective of public health and the environment. If non-detect for soil samples, wipe samples, and concrete samples then please state so in this section.

Soil samples should be tested to background levels for pH, and must be tested to non-detect or health-based risk levels for the organic constituents discussed. The background concentration should represent the original matrix (concrete, soil) condition before the facility was operated. It is critical that the background sample locations be representative of the natural or existing local conditions. These conditions should not be affected by operations of the unit or facility, or from previous uses. Background sampling locations should be indicated on a facility map along with the other sampling locations.

-Page XI-8, please cross-out or revise this statement, "that is, if payment or subsoil contains TCLP, TTLC, or STLC concentrations that exceed this criteria, it must be evaluated for risk to human health and the environment and cleaned or removed as necessary prior to clean closure.". The TCLP, TTLC, or STLC cannot be a rationale to evaluate risk based scenario because these are not health based values but rather for classification of hazardous waste for disposal purposes.

IX. Soil Removal/Cleanup Procedures

Describe the plan to remove contaminated soils to achieve the proposed cleanup levels.

X. Financial Responsibility

Financial assurance is needed to cover the estimated closure costs for the facility. This also includes the liability coverage for sudden accidental occurrences in amount of \$1 million per occurrence with at least \$2 million annual aggregate per facility.

XI. Site Security

Describe procedures that will be used to maintain a security system throughout the implementation of the closure; include fencing, signs, and 24-hour surveillance system descriptions.

XII. Closure Cost Estimate

Please include a detail closure cost estimate for the closure of the hazardous waste management units. The basis for the closure cost estimates should be provided such as disposal cost at an off-site facility, transportation cost, etc. Cost estimates based on the cost for on-site treatment of wastes may not be used. The closure cost estimates should be based on actual cost to the facility of hiring a third party to close the facility in a manner which would make closure the most expensive.

All elements of the closure and associated cost estimates should be discussed for each of the project components. These elements should include, but not limited to the following:

- 1) Maximum inventory of waste
- 2) Decontamination/removal
- 3) Residual waste generated during closure
- 4) Sampling and analysis
- 5) Certification

XIII. Health and Safety Plan

Please submit a Health and Safety Plan for the closure activities of the hazardous waste management units. The plan should address the following:

- 1) Hazard identification
- 2) Hazard evaluation
- 3) Personal protective equipment
- 4) Environmental monitoring
- 5) Site work zones
- 6) Decontamination of workers
- 7) Emergency procedures

Appendix B

Field Forms

Dow Torrance RCRA Closure

Independent PE Field Observation Form

Date: _____

Time: _____

Name/Title: _____

Closure Activities Observed:

Criteria for Evaluating Adequacy:

Is Activity Meeting Closure Requirements? (Describe):

Is there Any Deviation from Closure Plan Requirements? (Describe):

Describe Recommended Corrective Actions:

Describe Implementation and Results of Corrective Actions:

General Observations:

Signature

TYPES OF HAZARDS

"EXPECT THE UNEXPECTED"

Access

Congested area, Uneven ground, Confined Space, Overhead obstruction, Objects in walkway, Unsecured decking, Clutter

Caught In/Struck By

Sharp objects, Pinch points, Hot/cold surfaces, Open holes, Overhead workers, Struck-by objects, Strike against objects, Fire/spark

Environment

Noise, Dust, Weather, Lighting, Heat, Wet areas, Wind, Plant processes, Lead, Asbestos, Hot/Cold surface, Heat Stress

Ergonomic

Bad body position, Improper or static body position (awkward objects or work position), Excessive force (heavy objects, torque), Excessive repetition, Excessive duration, Over-reaching

Falls

To a lower level, At the same level, Slippery surface, Floor or wall opening, Unprotected perimeter, Climbing, Relocating, Corrosion

Hazardous Material

Burns, Exposure, Inhalation, Splashing, Fumes, Spills, Airborne Particles, Trapped substances, Lead, Asbestos, Radiation

Stored Energy

Pressure, Tension, Electrical, Combustible, Flammable/Explosive, Static electricity

Tools/Equipment

Airborne particles, Fumes, Arc flashes, Sharp edges, Line of fire, Wrong tool for the job, Broken tools, Rotating parts, Vibration, Shock

PERMIT REQUIREMENTS

"ASK ALL THE RIGHT QUESTIONS, AND QUESTION WHAT ISN'T RIGHT"

Y N/A

- ☐ ☐ STAC Card
- ☐ ☐ General (Safe) Work
- ☐ ☐ Hot (flame/spark) Work
- ☐ ☐ Hot (electrical) Work
- ☐ ☐ Excavation Work
- ☐ ☐ Confined Space Entry
- ☐ ☐ Initial (Line) Entry
- ☐ ☐ Crane/Critical Lift
- ☐ ☐ Scaffold Inspection
- ☐ Other: _____

Y N/A

PROCESS REQUIREMENTS

- ☐ ☐ Job scope understood
- ☐ ☐ Department Indoctrination completed
- ☐ ☐ LO/TO verified
- ☐ ☐ MSDS reviewed
- ☐ ☐ Lines drained/purged
- ☐ ☐ Low points checked
- ☐ ☐ Oxygen/Flammability check verified
- ☐ ☐ Line identification reconfirmed
- ☐ ☐ Close drain/vents when finished
- ☐ ☐ Initial entry procedure reviewed
- ☐ ☐ Confined Space Procedure/Rescue Plan Reviewed
- ☐ ☐ Tool/Equipment proper for job and in safe condition
- ☐ ☐ Communicated work with others in area
- ☐ Other: _____

PPE ASSESSMENT

- ☐ Hardhat ☐ Goggles ☐ Gloves: _____
- ☐ Safety glasses ☐ Face shield ☐ Clothing: _____
- ☐ Safety shoes ☐ Ear Plugs ☐ Air Monitor: _____
- ☐ Face protection ☐ Respirator: _____
- ☐ Other: _____

Y N/A

JOB COMPLETION REVIEW

- ☐ ☐ Work area cleaned up
- ☐ ☐ All red tags released and signed off by individuals
- ☐ ☐ Permit turned in to permit issuer
- ☐ ☐ Job status communicated to customer
- ☐ ☐ Customer's name _____

Safety Task Analysis Card (STAC)

PERSONAL WORK PERMIT

"My plan for a safe job"

Today's Date: _____ Time: _____

My Name: _____

My Company: _____

My Foreman/Coach: _____

My Job Location: _____

My Job Description: _____

I have been employed less than 90 days and I am considered an at risk employee. Yes _____ No _____

The name of my assigned "Buddy" is: _____

List each person in the crew.

EMERGENCY INFORMATION

☐ What is the wind direction? _____

☐ Reviewed emergency alarms/phone numbers.

☐ My escape route(s): _____

☐ My evacuation assembly point is: _____

☐ Location of eye wash/shower station: _____

Foreman/Coach Signature: _____

What secondary stopping device is utilized? _____

Directions: Print 1->2 Sided with previous page and cut out 6 Intervention Cards.

<p align="center">Partnership Orphan Remediation Site Safety Intervention Card</p> <p>Your Name (person who performed the intervention): _____</p> <p>Date: _____</p> <p>Site: _____</p> <p>Company of worker(s) observed (check one): <input type="checkbox"/> Partner or Partner's sub-contractor <input type="checkbox"/> Other</p> <p>Reminders: Safety Is A Team Effort! <i>Be polite, be professional</i> <i>Don't record names of workers observed</i></p>	<p>Ergonomics <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Personal Protective Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Tools & Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Hazard Recognition <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Motorized Vehicles <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Safe Work Practice <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Other <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments _____</p>
<p align="center">Partnership Orphan Remediation Site Safety Intervention Card</p> <p>Your Name (person who performed the intervention): _____</p> <p>Date: _____</p> <p>Site: _____</p> <p>Company of worker(s) observed (check one): <input type="checkbox"/> Partner or Partner's sub-contractor <input type="checkbox"/> Other</p> <p>Reminders: Safety Is A Team Effort! <i>Be polite, be professional</i> <i>Don't record names of workers observed</i></p>	<p>Ergonomics <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Personal Protective Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Tools & Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Hazard Recognition <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Motorized Vehicles <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Safe Work Practice <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Other <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments _____</p>
<p align="center">Partnership Orphan Remediation Site Safety Intervention Card</p> <p>Your Name (person who performed the intervention): _____</p> <p>Date: _____</p> <p>Site: _____</p> <p>Company of worker(s) observed (check one): <input type="checkbox"/> Partner or Partner's sub-contractor <input type="checkbox"/> Other</p> <p>Reminders: Safety Is A Team Effort! <i>Be polite, be professional</i> <i>Don't record names of workers observed</i></p>	<p>Ergonomics <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Personal Protective Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Tools & Equipment <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Hazard Recognition <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Motorized Vehicles <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Safe Work Practice <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Other <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments _____</p>

Behavior Observation Entry Form

Observer:

Self or Other

Location:

Plant:

Task:

Date:

Trade:

Dow/Contractor:

Form:

O&M

Free
Entry:

--

Category

<input type="checkbox"/>

Acceptable

<input type="checkbox"/>

Unacceptable

Include comments for unacceptable behaviors. Number and enter comments at bottom of form.

Personal Protective Equipment			1
Additional PPE required for task	<input type="checkbox"/>	<input type="checkbox"/>	#
Fall Restraint Device required/in good condition	<input type="checkbox"/>	<input type="checkbox"/>	#
Hard Hat is on and is in good condition	<input type="checkbox"/>	<input type="checkbox"/>	#
Proper eye protection for the task or area	<input type="checkbox"/>	<input type="checkbox"/>	#
Proper gloves for the task	<input type="checkbox"/>	<input type="checkbox"/>	#
Proper hearing protection for area or task	<input type="checkbox"/>	<input type="checkbox"/>	#

Job Site Conditions			3
Debris/Trash on site is handled properly	<input type="checkbox"/>	<input type="checkbox"/>	#
No Spills/Leaks identified	<input type="checkbox"/>	<input type="checkbox"/>	#
Site is clear of clutter/tripping hazards	<input type="checkbox"/>	<input type="checkbox"/>	#
Weather conditions are acceptable for task	<input type="checkbox"/>	<input type="checkbox"/>	#

Hazard Identification & Control			2
Hazards elimination/control measures employed	<input type="checkbox"/>	<input type="checkbox"/>	#
Hazards have been completely identified for task	<input type="checkbox"/>	<input type="checkbox"/>	#
STAC card complete and appropriate for task	<input type="checkbox"/>	<input type="checkbox"/>	#
	<input type="checkbox"/>	<input type="checkbox"/>	
Vehicles/Construction Equipment			6
Backup alarms are in working order	<input type="checkbox"/>	<input type="checkbox"/>	
Equipment Operator is qualified to run equipment	<input type="checkbox"/>	<input type="checkbox"/>	
Equipment Inspections completed/documented	<input type="checkbox"/>	<input type="checkbox"/>	#

Body Positions			4
Proper body positions used during task completion	<input type="checkbox"/>	<input type="checkbox"/>	#

SOP, Policies			7
Employees understand applicable job procedures	<input type="checkbox"/>	<input type="checkbox"/>	#
Logout/Tag out required and in compliance	<input type="checkbox"/>	<input type="checkbox"/>	#
Other permits/checklists required for task	<input type="checkbox"/>	<input type="checkbox"/>	
Safe Work Permit on site and appropriate for task	<input type="checkbox"/>	<input type="checkbox"/>	#

Tools and Equipment			5
Cranes/Lifts inspected and operator is certified	<input type="checkbox"/>	<input type="checkbox"/>	#
Guards/safety devices are in place and working	<input type="checkbox"/>	<input type="checkbox"/>	#
Ladders/Scaffolds are inspected and/or tied off	<input type="checkbox"/>	<input type="checkbox"/>	#
Proper tool for the task is used	<input type="checkbox"/>	<input type="checkbox"/>	#

Critical Behaviors			8
*Spotters are used when backing	<input type="checkbox"/>	<input type="checkbox"/>	#
*Vehicles are traveling at posted speeds	<input type="checkbox"/>	<input type="checkbox"/>	#

#

Other Comments

--

Observation Rating 1-4		Plus	
Interaction Rating 1-4		Delta:	

#	Comment

Behavior Observation Entry Form

Form:

O&M

Observer:

Self or Other

Location:

Plant:

Task:

Date:

Time:

Trade:

Dow/Contractor:

People:

Free
Entry:

Other Comments

Observation Rating 1-4

Plus

Interaction Rating 1-4

Delta:

#

Comment

STL

TEL: (714) 258-8610 . FAX: (714) 258-0921

PAGE: OF



CALIBRATION SHEET - ORGANIC VAPOR ANALYZER

[illegible]



VISITOR LOG SHEET

[illegible]



INVESTIGATION DERIVED WASTE

[illegible]

Project: Project Location: Project Number:	Log of Boring _____ Sheet ____ of ____
---	--

Date(s) Drilled	Logged By	Checked By
Drilling Method	Drilling Contractor	Total Depth of Borehole
Drill Rig Type	Sampler Type	Surface Elevation
Approx. Depth Groundwater Encountered	Borehole Diameter (Inches)	Top of PVC Elevation
Diameter of Well (Inches)	Type of Well Casing	Screen Perforation
Type of Sand Pack	Type and Depth of Seal(s)	
Comments		

Elevation, feet	Depth, feet	SAMPLES				Graphic Log	MATERIAL DESCRIPTION	Well Completion Log	OVA Headspace (ppm)	OVA Background (ppm)	Sample Time	REMARKS
		Type	Number	Blows/Foot	Inches Recovered							
0												
5												
10												
15												
20												
25												
30												
35												
40												
45												
50												

Appendix C

2006 RCRA Financial Assurance Submittal



2030 DOW CENTER
March 27, 2006

*****REVISED*****

Department of Toxic Substances Control
Financial Responsibility Section
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721
ATTN: Marvel Bradshaw

LETTER FROM CHIEF FINANCIAL OFFICER

Dear Sir or Madam:

I am the chief financial officer of The Dow Chemical Company, 2030 Dow Center, Midland, Michigan, 48674. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or postclosure care as specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8.

The firm identified above is the owner or operator of the following facilities/TTUs for which liability coverage for both sudden and nonsudden accidental occurrences is being demonstrated through the financial test specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8, sections 66264.147 and 66265.147:

<u>EPA ID#</u> <u>REGION 9</u>	<u>NAME/ADDRESS</u>	
CAD076528678	The Dow Chemical Company Pittsburg Plant PO Box 1398 Pittsburg, CA 94565	Sudden Insurance = \$2,000,000 Nonsudden Insurance = \$6,000,000
CAD009547050	The Dow Chemical Company Torrance Plant 305 Crenshaw Torrance, CA 90503	Sudden Insurance = \$2,000,000 Nonsudden Insurance = \$6,000,000

The firm identified above guarantees, through the guarantee specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8, sections 66264.147 and 66265.147, liability coverage for both sudden and nonsudden accidental occurrences at the following facilities/TTUs owned or operated by the following:

None.

The firm identified above is the direct or higher tier parent corporation of the owner or operator.

1. The firm identified above is the owner or operator of the following facilities/TTUs for which financial assurance for closure and/or postclosure or liability coverage is demonstrated through the financial test as specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8, section 66264.143, subsection (f), section 66264.145, subsection (f), section 66265.143, subsection (e), and section 66265.145, subsection (e). The current closure and/or postclosure cost estimates covered by the test are shown for each facility/TTU:

REGION 9

CAD076528678

The Dow Chemical Company
Pittsburg Plant
PO Box 1398
Pittsburg, CA 94565

Closure = \$2,686,680**
Postclosure = \$1,782,529**
Corrective Action = \$57,596,060**
Groundwater Treatment Plant
Closure = \$147,831

(Cost Estimates Revised)**

CAD009547050

The Dow Chemical Company
Torrance Plant
305 Crenshaw
Torrance, CA 90503

Closure = \$458,773

2. The firm identified above guarantees, through the guarantee as specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8, section 66264.143, subsection (f), section 66264.145, subsection (f), section 66265.143, subsection (e), and section 66265.145, subsection (e), the closure and/or postclosure care or liability coverage of the following facilities/TTUs owned or operated by the guaranteed party. The current cost estimates for the closure or postclosure care so guaranteed are shown for each facility/TTU:

None.

3. In states where the U.S. Environmental Protection Agency is not administering the financial requirements of subpart H of 40 CFR parts 264 and 265, this firm as owner, operator or guarantor is demonstrating financial assurance for the closure or postclosure care of the following facilities/TTUs through the use of a financial test equivalent or substantially equivalent to the financial test specified in California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8, section 66264.143, subsection (f), section 66264.145, subsection (f), section 66265.143, subsection (e), and section 66265.145, subsection (e). The current closure and/or postclosure cost estimates covered by such a test are shown for each facility/TTU:

REGION 1

CT001159730

The Dow Chemical Company
Allyn's Point
Route 12
Gales Ferry, CT 06335

Closure = \$169,008

NHD048724173

Hampshire Chemical Corp.
2 East Spit Brook Road
Nashua, NH 03060-5633

Corrective Action = \$151,091

REGION 4

GAD045929643

The Dow Chemical Company
Dalton Plant
1468 Prosser Drive, SE
Dalton, GA 30720

Corrective Action = \$3,930,493

REGION 5

MID000724724

The Dow Chemical Company
MI Division/MI Plant
1261 Building
Midland, MI 48674

Closure = \$96,952,558
Postclosure = \$2,293,112

MID980617435

The Dow Chemical Company
MI Division/Salzburg Plant
Salzburg & Waldo Roads
Midland, MI 48640

Closure = \$6,826,199
Postclosure = \$1,474,366

REGION 6

LAD008187080

The Dow Chemical Company
Louisiana Division
PO Box 150
Plaquemine, LA 70764

Closure = \$4,118,073
Postclosure = \$486,800

LAD020597597

Angus Chemical Company
Sterlington Facility
PO Box 1325
Sterlington, LA 71280

Closure = \$115,097

TXD008092793

The Dow Chemical Company
Texas Operations
B-1226
Freeport, TX 77541

Closure = \$66,754,361
Postclosure = \$25,980,850
Corrective Action = \$144,814,964

TXD096037932
Used Oil #A85819

Johann Haltermann Ltd.
Dow Haltermann Houston
Jacintoport Plant
16717 Jacintoport Boulevard
Houston, TX 77015

Closure = \$284,247

TXD00017756

The Dow Chemical Company
La Porte Facility
PO Box 687
La Porte, TX 77571

Corrective Action = \$4,250,000

TXR000057414

The Dow Chemical Company
Clear Lake Operations
9502B Bayport Boulevard
Pasadena, TX 77507

Closure = \$843,324

4. The firm identified above is the owner or operator of the following facilities/TTUs for which financial assurance for closure or, if a disposal facility, postclosure care, is not demonstrated either to U.S. Environmental Protection Agency or a State through the financial test or any other financial assurance mechanism as specified in California Code of Regulations, title 22, division 4.5, chapters 14 and 15, article 8 or equivalent or substantially equivalent State mechanisms. The current closure and/or postclosure cost estimates not covered by such financial assurance are shown for each facility/TTU:

None.

5. The firm is the owner or operator or guarantor of the following Underground Injection Control facilities for which financial assurance for plugging and abandonment is required under 40 CFR part 144 and is assured through a financial test. The current closure cost estimates as specified in 40 CFR 144.62 are shown for each facility:

REGION 6

LAD020597597

Angus Chemical Company
Sterlington Facility
PO Box 1325
Sterlington, LA 71280

Plugging & Abandonment
= \$228,238

This firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 2005.

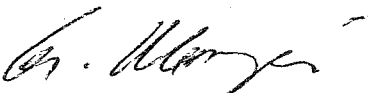
This firm is using Alternative II for Part B.

Part B. Closure or Postclosure Care and Liability Coverage

ALTERNATIVE IV

- | | |
|--|----------------------|
| 1. Sum of current closure and postclosure cost estimates (Total of all cost estimates shown in the paragraphs of the letter to the Director of the Department of Toxic Substances Control) | \$422,344,654 |
| 2. Amount of annual aggregate liability coverage to be demonstrated | \$8,000,000 |
| 3. Sum of lines 1 and 2 | \$430,344,654 |
| 4. Current bond rating of most recent issuance and name of rating service | A- (S&P) |
| 5. Date of issuance of bond | November 22, 2002 |
| 6. Date of maturity of bond | November 15, 2007 |
| *7. Tangible net worth (if any portion of the closure and postclosure cost estimates is included in "total liabilities" on your firm's financial statements, you may add the amount of that portion to this line.) | \$11,741,000,000 |
| *8. Total assets in the United States (required only if less than 90 percent of firm's assets are located in the United States) | \$24,652,000,000 |
| | <u>YES</u> <u>NO</u> |
| 9. Is line 7 at least \$10 Million | X |
| 10. Is line 7 at least 6 times line 3 | X |
| *11. Are at least 90 percent of the firm's assets located in the United States? If not, complete line 12 | X |
| 12. Is line 8 at least 6 times line 3 | X |

I hereby certify that the wording of this letter is identical to the wording as specified in California Code of Regulations, title 22, section 66264.151, subsection (g) and is being executed in accordance with the requirements of California Code of Regulations, title 22, division 4.5, chapter 14 and 15, article 8.


Geoffery E. Merszei
Executive Vice President
And Chief Financial Officer
The Dow Chemical Company

March 27, 2006

cc: Michele Osmun, The Dow Chemical Company, 2030 Dow Center, Midland, MI
Greg Dubitsky, The Dow Chemical Company, Pittsburg, CA
Marv Louie, The Dow Chemical Company, Pittsburg, CA
Nang Wong, The Dow Chemical Company, Torrance, CA
Alec Naugle, California Regional Water Quality Control Board, San Francisco Bay Region,
1515 Clay Street, Suite 1400, Oakland, CA 94612

NOTE: Please direct all correspondence related to this letter to Michele Osmun, 2030 Dow Center, Midland, MI 48674. Phone (989) 636-5581 or Fax (989) 638-9636.



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Suite 400
3320 Ridgecrest Drive
Midland, MI 48642-5859
USA

Tel: +1 989 631 2370
Fax: +1 989 631 4485
www.deloitte.com

INDEPENDENT ACCOUNTANTS' REPORT ON APPLYING AGREED-UPON PROCEDURES

To the Board of Directors
The Dow Chemical Company
Midland, Michigan

We have performed the procedures included in the Code of Federal Regulations ("CFR"), Title 40, Part 264, Section 143 (40 CFR 264.143), which were agreed to by the Department of Toxic Substances Control – Financial Responsibility Section and The Dow Chemical Company ("Dow"), solely to assist the specified parties in evaluating Dow's compliance with the financial test option as of December 31, 2005, included in the accompanying letter dated March 27, 2006 from Mr. Geoffery E. Merszei of Dow. Management is responsible for Dow's compliance with those requirements. This agreed-upon procedures engagement was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. The sufficiency of these procedures is solely the responsibility of the parties specified in this report. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which this report has been requested or for any other purpose.

The procedures that we performed and related findings are as follows:

We recomputed from, or reconciled to, the audited consolidated financial statements of Dow as of and for the year ended December 31, 2005, on which we have issued our report dated February 8, 2006 (which report expresses an unqualified opinion and includes an explanatory paragraph relating to a change in the method of accounting for stock-based compensation to conform to Statement of Financial Accounting Standards No. 123 for new grants of equity instruments to employees) the information included in Items 7, 8 and 11 under the caption Alternative IV in the Letter referred to above and noted no differences.

We were not engaged to, and did not, perform an examination, the objective of which would be the expression of an opinion on the accompanying letter dated March 27, 2006. Accordingly, we do not express such an opinion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

This report is intended solely for the information and use of the board of directors and management of Dow and the specified parties listed in the first paragraph, and is not intended to be and should not be used by anyone other than these specified parties.

March 27, 2006